Cryptocurrency: Genesis, Growth and Concerns

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The present currency system is the result of an evolutionary process spanning over several centuries. It has seen many changes viz, barter, cowrie shells, coins of base metals, coins of precious metals like gold and silver before culminating in firmly established paper currency. In the computer age, there are further changes like electronic transfer of money instead of cash transfer. The system has now entered a new phase with the introduction of crypto-currency or digital currency which has a history of thirteen years. A private currency regime has been launched with far reaching implications. Its pros and cons are being intensely debated, some advocating an outright ban and some advocating regulation without imposing a ban on it. To clearly under-stand the debate going on about the ban or regulation, it is necessary to under-stand the genesis, growth and operations of the novel currency system.

Cryptocurrency is a digital currency or virtual currency without a physical form. It exists in a digital ledger or a blockchain. It is supposed to function as a medium of exchange, a unit of account and a store of value like the present currency in use. It is very unique, as it is created by private parties and not by any government or central bank. It is also a universal currency not restricted to any sovereign borders.

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The genesis of cryptocurrency can be traced back to the year 2008 when a programmer with a pseudo name SATOSHI NAKAMOTO published a white paper titled 'Bitcoin – A Peer-to-Peer Electronic Cash System' in which he outlined the creation of a cryptocurrency. In 2009, he created the first cryptocurrency called Bitcoin which soon became very famous and paved the way for the creation of many similar coins which are called Alternative Coins or altcoins. Following this, mushrooming of cryptocurrencies has taken place with a large number of coins bearing different names. Some of the examples apart from Bitcoin are Etherium (ETH), Dogecoin (DOGE), Thether (USDT), Solana (SOL), and Shibu Inu.

The way in which cryptocurrency is created is very unique and mysterious. The process of its creation is known as 'mining' and the creators of this novel currency compare this with mining of gold. Taking the example of Bitcoin, it is said that "Bitcoin looks like a 21st century version of gold. It can be created or mined through effort. Its creators ingeniously established an analogy with gold. Just as the price of gold depended on the fact that it took a great deal of human exertion to extract it from large quantity of earth in remote locations, Bitcoin requires large amounts of computer power driven by cheap energy in remote areas of Asia or in Iceland". (Harold James 2018).

A network of computers (nodes) is engaged in this task of 'mining' which simply refers to solving a complex mathematical puzzle. Those who are participating in this are called miners. All the miners in the network will be competing to solve the puzzle and whoever solves it first will be treated as the creator and he will be rewarded with a certain amount of Bitcoin. Thus, 'mining' may be described as the process of releasing and adding a new coin to the block. One problem with 'mining' is that it involves the use of powerful computers with expensive accessories and enormous amount of power consumption. An additional and very important task of 'mining' is verification and validation or auditing of all transactions, for which miners are rewarded.

Blockchain technology is the heart of the cryptocurrency system. A blockchain is a form of Distributed Ledger Technology (DLT). A digital ledger in which transactions are recorded is distributed among all the participants in the network or in other words, the information is shared by all the participants. Transactions are recorded in blocks, each block having a limit of 3000 transactions. Once that limit is reached, that block is linked with the previous block and a new block is opened and when it reaches the limit, it is again linked with the previous block and thus a chain of blocks is created. When the new information is verified and validated, a consensus is reached by the participants in the network and that data becomes tamper-proof and no single entity can change the data and the security of data is maintained.

Further, secrecy of transactions is maintained by employing encryption

and decryption technology. Any message sent to a recipient is encrypted or converted into coded language and the recipient converts it into normal language by decryption. Anonymity of the crypto users is maintained as the technology is used in such a way that while the total volume of transactions can be known by anybody, who sends the money and who receives the money cannot be known by any unconcerned entity. Thus, the strength of cryptocurrency lies in its revolutionary technology.

Distinguishing Features

The following are the main distinguishing features of cryptocurrency:

1. Absence of the physical form is the unique feature of crypto-currency. It is merely an entry in the distributed ledger or blockchain maintained by a computer network, as an electronic code. It can be neither seen nor touched. Transactions take place through peer-to-peer transfers on purchase and sale of cryptocurrency without the intermediation of any financial institution. Absence of any third party involvement in the transactions is considered to be the chief advantage of the crypto system. Cryptocurrency is not a substitute to the existing currency. It can, however, be converted into real currency and it is acceptable only because of this reason.

2. Cryptocurrency can be divided into small units, just as a Rupee can be divided into one hundred paise. For example, a Bitcoin can be divided into several small units. Small units are called milli bitcoin (Mbtc) and the smallest units are called satoshi, named after the creator of Bitcoin. One milli bitcoin is equal to 1/1000 Bitcoin and one satoshi is equal to 1/100,000,000 Bitcoin. Tokens which represent a certain amount of Bitcoin are also in circulation.

3. The currency in circulation now is called fiat money. It has no intrinsic value. It has value and acceptability simply because of the guarantee given by the government/ central bank. Further, it is declared as legal tender and nobody can refuse to accept in settlement of debt or in other legally valid transactions. Bitcoin also lacks intrinsic value. Its value is derived from the cost involved in its creation, viz., the cost of computers and power consumption and also from its scarcity and high demand. Creation of Bitcoins is deliberately restricted to 21 million units and this limit will be reached only in 2140. The number of units released will be reduced by half once in four years and this will continue until the overall limit is reached in 2140. In the case of other crypto coins also limits are fixed, though there is no uniformity in it. Cryptocurrency lacks the status of a legal tender. It is not declared legal tender anywhere except in El Salvador and Cuba.

4. Though the cryptocurrency is intended to be a medium of exchange, it is still not widely accepted in retail transactions. There are very limited instances of its use in retail trade. Its usage is more in transactions involving large amounts. When Elon Musk announced that he will accept Bitcoin for buying cars, its usage received a big boost. But after some time he expressed himself against it on the ground that the cryptocurrency system is not environment-friendly as it consumes a lot of power requiring additional power production which leads to an increase in carbon discharge and the consequent climate change. When the proponents of cryptocurrency convinced him that they rely more on non-traditional sources of power which do not pollute the atmosphere, he expressed his willingness to accept Bitcoin in payment for his company's cars. Further, he has allowed Bitcoin's usage in his stores by consumers for merchandise transactions. Cryptocurrency's importance lies more in its usage as a store of value. It is more familiar as an asset rather than a medium of exchange.

5. Cryptocurrency is essentially a private currency created by individuals or companies. Though there have been very limited and mostly unsuccessful experiments with private currency, the currency system has always been associated with sovereignty. Sovereign responsibility to issue currency and to regulate its supply has been well established. The inspiration to create private currency seems to have its roots in the Austrian school of Economics which advocated a libertarian or free market approach to currency issues. This ideology was propounded by the famous Austrian Economist Fredrich Von Hayek in his 'Decentralisation of Money: The Argument Refined'. He argued that a currency system free from state/ central bank control should be developed. The idea was that monetary management should be free from state/central bank regulation.

On the same lines, Germany's J.S.Gesell, advocated 'Community Currency' devoid of regulation by the national government. (Andreas Adriano 2021) This currency meant for use by a particular community was supposed to contribute in a big way to local development. In the 1930s community currencies were introduced in many countries hoping that the approach would help the recovery from depression. Even after 1930s USA, Switzerland, Turkey, Brazil and other countries experimented with local community

currencies without much success. These experiments with a currency system devoid of link with sovereignty might have inspired the creation of cryptocurrency.

Growth of Cryptocurrency

Growth of cryptocurrency is reflected in the increase in the number, prices and market capitalization. There are currently (9th Feb' 2022) 17,436 cryptocurrencies bearing different names. (Rabi Sankar, T 2022) Regarding the price, it is the Bitcoin which has seen the biggest increase. With just a few dollars in the beginning, after seeing many ups and downs, the price of Bitcoin rose to as much as $69,000 on November 10, 2021. Though thereafter, it declined by nearly half, it is again recovering and the market expectation is that it will rise to $100,000 in the near future. Such big rise is not true of all the altcoins. However, the crypto market as a whole has recorded a tremendous growth. With the rise in price, market capitalization has also recorded a big rise.

Taking all the cryptocurrencies together, their market capitalisation increased from $20 billion in Feb' 2017 to $2.9 trillion in Nov' 2021 and declined to $1.98 trillion in Feb'2022. (Rabi Sankar, T 2022) Only a few cryptocurrencies account for the major share of the total market capitalization. To give some examples, Present market capitalisation of the top Cryptocurrencies is as follows: Bitcoin: $933 billion, Etherium: $488 billion, Dogecoin: 23 billion, Tether (USDT): $76 billion, and Solana: $58 billion. Top five crypto currencies account for 71 percent of the total market capitalization. Further, the rise of the crypto market is the most important indicator of the growth of cryptocurrency.

Crypto Market

Crypto's role as an asset is the most significant aspect of the crypto world. Cryptocurrencies have created a new avenue for investors. Trading in cryptocurrencies and the tokens which represent a certain amount of cryptocurrency has grown at an incredible rate. Individuals and institutions have been attracted to the market because of the limited scope for making gains in the other markets. This market remains attractive despite unusual volatility in the price. Volatility is of such a magnitude that one may either become super-rich overnight or lose all the investment made. It is a highly speculative market and those who are not risk-averse participate in it. Success stories, however, motivate people to participate in this market and thus the number of investors has gone up by leaps and bounds.

Several Crypto Exchanges have come up all over the world and crypto trade takes place through them. Their work is similar to that of a stock exchange where trading in shares takes place. In each crypto exchange several cryptocurrencies and the tokens which represent them are bought and sold. Some examples of top Crypto Exchanges are Binance, Coin Flex, Coinbase Exchange, DEEP Coin, Upbin, Kucoin and TOKENCAN.

Crypto market has grown rapidly in India also. According to the Governor of RBI Shaktikanta Das, in the absence of any official data, it is estimated that there are 5 to 20 million crypto investors with an investment of about $5.4 billion in India (Economic Times, 10th Feb' 2022). Some important Crypto Exchanges operating in India are Coinswitch Kuber, Wazir X, Buy U Coin, Coin DCX, bitbins, Zebpay, and Oluttus. Coinswitch Kuber, being a leading exchange, it is offering more than 80 cryptos for trading. Apart from trade in cryptocurrency, some exchanges also deal in Non-fungible Tokens (NFTs). Etherium platform is the one widely used for trading in NFTs. Investors can own art works, videos etc., in digital form, their ownership being securely stored through the blockchain. The advantage to the artists is that they are saved from exploitation by the art galleries and traders who knock away a greater portion of monetary gain. On the whole, operations in NFTs have brought about a revolution in entertainment industry.

Those who have established crypto exchanges have amassed a great amount of wealth through their operations. Many have become billionaires. For example, the owner of Binance, Chaina-Canadian Zhao has a networth of $96.5 billion. The creator of Etherium, Vitalik Buterin and the founder of Coinbase, Brian Armstrong have become billionaires. Encouraged by such examples, many are entering the crypto world, in spite of the fact that it is a highly risky venture. However, ordinary investors and those who are risk-averse keep away from this market.

Concerns

The following are some of the concerns expressed by many experts about the cryptocurrency and its operations:

1. First and foremost, the very ideology of cryptocurrency is questionable. It snaps the link between currency and sovereignty, which is not desirable. Over time, it has come to be firmly established that each nation must have its own currency for circulation within its national boundaries issued and managed by a sovereign authority. Cryptocurrency being a private currency, its creation and management fall outside the

jurisdiction of the state. Circulation of a private currency side by side with the sovereign currency will undermine the monetary policy and exercising control over inflation and deflation by the central bank of the country becomes extremely difficult. Anarchy in money matters is not good for any country. It also weakens the ability of the central bank to maintain financial stability. In defence, the proponents of crypto-currency point out that the entire system is subject to self-discipline and the creation of cryptocurrency is subject to a self-imposed limit based on a code. This may be true of Bitcoin and a few other prominent cryptos, but not of the crypto world as a whole. It has also been pointed out that the crypto system has actually a deflationary-bias. But deflation is as bad as inflation and money creation cannot be always based on a code. Some discretion in money creation is necessary to meet the changing economic situations.

2. In the absence of state regulation, there is mushrooming of cryptocurrencies. There is no guarantee that all of them will survive and flourish and most of them are likely to disappear. Therefore, there is possibility of investors in such currencies suffering losses.

3. Cryptocurrency transactions, which are unregulated pose a threat to foreign exchange management involving inflow and outflow of foreign exchange. When foreign exchange transactions are regulated, orderly inflow and outflow of foreign exchange takes place and also transactions take place for legitimate purposes. The real threat from cryptocurrency arises from the enormous scope it provides for illegal transactions like money laundering and financing of terrorist activities. The anonymous nature of crypto transactions is conducive for illegal transactions.

4. Despite all the technical progress, thefts and other crimes have been taking place on a large scale causing huge losses to the market participants. According to Chainalysis Report 2021, "Crypto-currency-based crime hit a new all-time high in 2021, with illicit addresses receiving $14 billion over the course of the year, up from $7.8 billion in 2020". Crypto transactions are likened to Havala transactions. Further, scams like Ponzi schemes have also been taking place. There are instances of crypto exchanges collecting money from the investors and suddenly disappearing, causing losses to the investors.

5. Extreme volatility in the crypto market is another big concern. Prices go up and come down in a big way within minutes. It is a highly speculative market. Even in the case of Bitcoin, the strongest crypto-currency, very severe fluctuations in prices have been taking place. Volatility is even more in the case of altcoins. The absence of investor protection is a matter of great concern.

6. Another factor which goes against the cryptocurrency system is that it is not environment-friendly. Enormous amount of power is consumed by 'mining' activity. It is estimated that the power consumed by the crypto 'mining' in a year is equivalent to "about 73 terawatt-hours of electricity a year — double Denmark's usage" and that miners discharge "more than 64 million tons of carbon dioxide into the atmosphere annually" (Analisa R Bala 2021) As the crypto world expands, more and more power production becomes necessary which means more discharge of carbon, causing climate change with all its associated problems. Unless miners depend more on non-traditional sources of energy and also bring about technological changes which reduce power consumption, environmental damage cannot be avoided.

Ban or Regulation

Opinion is sharply divided about the question of whether the cryptocurrency should be banned or regulated. On the basis of the several concerns discussed above, many economists including Nobel laureates and financial experts and central bankers have expressed themselves against crypto system. Paul Krugman has pointed out that the "digital tokens serve no economic purpose and that their valuation is tenuous". Highlighting the dangers of speculative nature of the Bitcoin, he observed that "If speculators were to have a collective movement of doubt, suddenly fearing that bitcoins were worthless, well, Bitcoins would become worthless" (investopedia 2022). Nourial Roubini, Professor of Economics at the New York University's Stern School of Business says that "...calling these Bitcoins or rather cryptocurrencies as currency is a misnomer.

Anybody who knows anything about monetary theory, knows that for something to be a currency first of all there must be a unit of account but not in its price in Bitcoins. Two, it has to be a scalable means of payment". (Republic World.com 2021) He also calls Bitcoin a 'pseudo asset'. Shaktikant Das, Governor, Reserve Bank of India compares the rise of cryptocurrency with the Dutch 'Tulip Mania' which caused terrible loss to many and considering the impact on monetary policy and financial stability, he advocates outright ban of cryptocurrency. (Economic Times, 10th Feb'2022). In fact RBI had issued in April 2018, a circular to all Banks not to provide any services to facilitate cryptocurrency transactions. But the Supreme Court intervened and quashed this order. However,

the RBI continues to hold the view that the cryptocurrency should be banned outright. Central Banks, in general, are in favor of outright ban.

The RBI has also advocated introduction of Central Bank Digital Currency (CBDC), just as China and Russia have done in order to provide a safer payments system and to wean away customers from risky private cryptocurrency system. Unlike a private digital currency, CBDC will be a legal tender with all the features of fiat money. It is only the regular currency in a digital form. The RBI has been doing all the preparatory work for introducing digital currency and it will be a reality very soon.

Though many have advocated outright ban of cryptocurrency, the predominant view appears to be in favour of regulation rather than outright ban. The novel currency has been in existence for over a decade and during this period the crypto market has registered a fantastic growth and millions have accepted crypto asset. It may not be appropriate to go in for outright ban at this stage. Many countries have started framing regulation to control the activities of the crypto market keeping in view the objective of protecting the interests of the investors. Regulation is justified also from the point of view of controlling the illegal activities such as money laundering, financing of terrorism etc, taking place through the crypto market.

The view of the Government of India also appears to be in favour of regulation. Its contention is that cryptocurrency cannot be recognised as legal tender, but it can be recognized as an asset subject to regulation by SEBI and Reserve Bank of India. The Union Budget 2022-23 has brought the crypto market transactions under the tax policy framework by imposing 30 percent tax on gains from trading and provision has also been made for TDS and a tax on gift of cryptocurrency. This, however, does not mean that cryptocurrency is legalized. The proposed Crypto-currency and Regulation of Official Digital Currency Bill has not yet been finalised. The actual regulatory regime will be known only after the Bill is passed.

In sum, the emergence of cryptocurrency has heralded a new and significant stage in the evolution of the currency system. But even thirteen years after its first appearance, there is still a raging controversy about its utility. An unregulated private currency system is at any rate not acceptable. Though the overwhelming opinion is in favour of state regulation rather than an outright ban, the regulatory regime is still evolving and there is no uniform approach to regulation in all the countries. Since this is a global currency, a global approach to regulation is necessary and all the countries should join together in working out an appropriate regulatory mechanism.

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Cost of Internet Shutdowns

Total Economic Cost of Internet Shutdown by Country in 2022 ($million)

Rank	Country	Total Cost ($million)	Duration (Hours)	Users affected (Million)
1	Russia	1,360	591	113.0
2	Kazakhstan	429.5	142	16.1
3	Myanmar	202.6	3,888	1.6
4	Nigeria	82.7	287	104.4
5	Ethiopia	32.4	1,944	1.0
6	Burkina Faso	12.6	380	4.0
7	Sudan	4.8	20	13.2
8	Zimbabwe	1.8	12	5.0

Then economic costs of Russia's Internet shutdowns for a total of 591 hours amount to $1.36 billion so far.

{Source- *The Economic Times*, March 26, 2022}