International Journal of Foreign Trade and International Business

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Cryptocurrency in India: An assessment of the prospects and challenges

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Abstract
To execute transactional operations in the financial trading industry, cryptocurrencies like as bitcoin make use of decentralisation, traceability, and anonymity properties. These digital currencies, which are based on new blockchain technology, are serving as the foundation for some of the world's biggest unregulated marketplaces. A variety of regulatory difficulties arise as a result, including the illegal acquisition of narcotics and weapons, money laundering, and the support of terrorist operations, among others. This chapter examines a variety of legal and ethical implications, as well as their consequences and potential solutions to the fundamental problems that policymakers and regulators are today confronted with on a daily basis. The authors present the findings of an analysis of 30 recently published peer-reviewed scientific publications, and they propose a number of mechanisms that can aid in the detection and prevention of illegal activities, which currently account for a significant portion of cryptocurrency trading at this time. These researchers propose methodologies and apps that may be used to detect dark markets in the future, should the need arise.

Keywords: cryptocurrencies, bitcoin, decentralization, traceability, and anonymity properties

1. Introduction
Money is very important in the lives of all living beings on this planet, and its history can be traced back to the ancient times when gold, silver, and other metal coins were used to acquire products and other essentials for daily existence. In fact, before the advent of the monetary system, the barter system served as the primary form of transaction, in which individuals traded things in return for other items that matched their unique wants or requirements, rather than exchanging money for goods. After a while, the barter system was phased out in favour of the monetary system, and as time went on, other currencies emerged, which were eventually adopted by various nations throughout the globe. Metal coins, which were traditionally used for trade, were supplanted by paper money, which was easier to transport from one location to another and whose availability in large amounts in printed paper form aided large corporations in carrying out large transactions. Since a result of the creation of plastic money in the mid-20th century, the usage of cash transactions gradually began to go away, as it handled security difficulties such as the theft or theft of huge sums of cash, which had previously existed. It became more convenient for consumers to maintain a plastic card in their wallet to use for a variety of transactions rather than a large quantity of cash in their wallet. In later years, as computers and the Internet continued to develop, we were able to use Internet banking, and now, thanks to the advancement of mobile phone technology, we can easily take advantage of services such as mobile banking and mobile payment gateways, which allow us to complete all transactions with a single click on our mobile device. We no longer need to carry anything other than a smart mobile phone, and the rest will be taken care of by all of the modern technology at our fingertips. In the past, we were required to have a specific amount of cash printed or minted by the government and kept in a bank, which is a form of the centralized system, but now we have progressed one step further and a decentralised form of currency known as cryptocurrency has emerged and is being used in transactions for a wide range of purposes, which is a form of the decentralised system. Cryptocurrency is a digital money that was developed to be used in the same way that regular currency is. This cryptocurrency network makes use of encryption and blockchain technology to safeguard its exchanges, restrict the generation of a certain form of cryptocurrency, and keep account of every transaction that takes place within the network [1, 2].

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2. Cryptography

Cryptography is an age-old technique that is used to protect data or information from being stolen or exploited. It has been around for a long time. In cryptography, material is encrypted in the form of cipher text and then decoded so that it may be comprehended by the intended recipient (the user) [3].

3. Blockchain and cryptocurrency

This public ledger, which is powered by decentralized blockchain technology, serves as the foundation for many of today's most popular cryptocurrency currencies. It stores all of the transactions that have taken place inside the network for anyone to independently verify. It is public ledgers that allow for the possibility of trustless peer-to-peer transactions since the users of a digital currency are aware that all of the transactions that take place on the network will be verified and posted on the blockchain. Transactions on a blockchain are recorded chronologically, resulting in an immutable chain of records. Transactions on a blockchain might be more or less private or anonymous depending on how the technology is implemented. The ledger is dispersed throughout a large number of network members; it does not reside in a single location. Instead, copies of the data are kept on hand and are updated in real time with every fully participating node in the ecosystem. A block might represent a variety of different sorts of transactions and data, including cash, digital rights, intellectual property, identity, and property titles, to mention a few possibilities. (Bitcoin was the world's first cryptocurrency, having been launched in 2009. When Satoshi Nakamoto (the mysterious creator of Bitcoin) announced the first public release of Bitcoin, a revolutionary electronic payment system that employs a peer-to-peer network or blockchain to avoid double-spending, it was met with widespread acclaim. Without the need of a server or any central authority, the system is fully decentralised. The formation and setting of the value of these currencies are fully based on the actions of the general public and the market. Although the cryptocurrency is loaded with cutting-edge technologies and has a significant market presence all over the world, it has yet to establish itself as a new-age currency system in the majority of countries around the world, despite more than a decade of existence. As a result, many people remain sceptical about the cryptocurrency's worth. A rising number of nations are taking steps to regularise its usage in day-to-day commercial transactions, while others are regulating its use as part of an investment portfolio, particularly in the form of digital assets, by developing laws and regulations. However, nations such as India and China are not taking a positive position toward cryptocurrencies, whether as a form of money or as an investment instrument, as of now.

4. Cryptocurrency Industry Profile:

Cryptocurrency is a digital currency that is completely intangible and that relies on cryptography and blockchain as the major technological backbone in its creation and further processing, such as transactions, distribution, and security of different cryptocurrencies. Cryptography and blockchain are the major technological backbone in its creation and further processing, such as transactions, distribution, and security of different cryptocurrencies. In 2009, a pseudonymous inventor called Satoshi Nakamoto established the first cryptocurrency, Bitcoin, which has since been followed by

the creation of hundreds of other cryptocurrencies, or altcoins, until the present day. Many governments throughout the globe have adopted a positive position toward the adoption and legalisation of cryptocurrencies; yet, many countries around the world, including India, remain sceptical about the legalisation of cryptocurrency. There are several difficulties associated with cryptocurrencies, including as volatility, security, legal issues, and so on and so forth. Trying to estimate the actual market size of any sector is a challenging endeavour, and in the case of cryptocurrencies, it is a monumental effort due to its extreme volatility. Every now and again, the value of the asset varies significantly. Recent times, i.e. during the past two years, have seen the rise of cryptocurrencies, particularly Bitcoin, to become a big player in terms of market capitalization all over the world. Market capitalization is calculated by multiplying the number of coins currently available in the market by the current market price of that coin under the current market conditions.

5. Various Types of Cryptocurrency

According to latest projections, the total number of cryptocurrency exchanges in existence worldwide has risen to well over 1600, and that figure is growing by the day. The following are only a few of the many cryptocurrencies, along with descriptions of each.

- **Bitcoins**

Cryptographic rules are used in the case of Bitcoin to govern and establish the unit of money known as a bitcoin, which is used to store and transfer value. A cryptocurrency, bitcoin falls under the category of digital assets, and it was the first and most valued of all the cryptocurrencies that were recognised at the time of its creation. The term "decentralised digital money" is often used to refer to this in some quarters.

- **Litecoins**

Litecoin is a cryptocurrency that is similar to bitcoin. This kind of cryptocurrency is also referred to as peer-to-peer cryptocurrency. Open-source software is made accessible as part of the project. It was distributed under the terms of the MIT/X11 licence. A cryptographic protocol and algorithm are used to facilitate the generation and transmission of Litecoin coins, which are available for free download. Litecoin and Bitcoin are almost comparable in terms of technological specifications. The processing speed of the network is the only significant variation between the two scenarios. The network speed of Litecoin is much quicker than that of bitcoin. Furthermore, the algorithm employed in Litecoin is distinct from the method used in Bitcoin.

- **Ethereum**

Ethereum is a blockchain-based open-source software platform that makes use of distributed ledger technology. Build and deploy decentralised apps with the help of this open-source project, which is free to use. Ethereum, like Bitcoin, is a cryptocurrency that is released to the public for use as a blockchain network. When comparing Bitcoin with Ethereum, the most significant distinction is the method in which the blockchain application platform is used in both situations. Bitcoin is a digital currency. However, unlike bitcoin, where the blockchain technology/platform can only be used for one specific application where peer-to-peer

transactions take place, in the case of Ethereum, the blockchain technology/platform may be utilised for any decentralised application.

- **Namecoin**

Namecoin is another cryptocurrency that falls under the cryptocurrency preview category. It is an experimental open-source project that makes use of technology that can improve security, the way decentralisation is carried out, and can also control the speed of the internet for some network infrastructures, among other things. When it comes to the transfer mechanism, it makes use of key/value pair registration and follows the Bitcoin technology.

- **Ripple**

Ripple is more well-known for its digital payment services than it is for its cryptocurrency, which makes sense. Ripple operates on a peer-to-peer decentralised network and, like Bitcoin, is built using open source technology to achieve its goals. It enables quick and seamless money transfers regardless of the kind of currency being used, such as bitcoin, litecoin, yen, or USD.

- **Auroracoin**

Auroracoin is a cryptocurrency noted for being decentralised, peer-to-peer, and safe, and it was first introduced in Iceland in 2014. In order to escape the governmental limitations connected with Icelandic Króna, this money was created as a substitute for the national currency. The goal of launching this currency is to replace the present currency and establish it as the official cryptocurrency of Iceland, which is why it was created. As the first currency to be classified as a country-specific cryptocurrency, it was the yen.

- **Monero**

Monero, a cryptocurrency that was first introduced in April 2014, is an open-source project. MXR is the abbreviation for this. It largely focuses on real estate, in which individual units must be interchangeable with one another.

In addition, decentralisation and privacy are important. Monero makes use of an ambiguous public ledger, which means that anybody may do transactions, but no one outside the network can identify where the money is coming from, how much it is worth, or where it is going. The Proof of Work process is used by Monero to verify transactions across a network in a safe way, and it was developed by the Bitcoin Foundation.

- **Zcash**

Zcash, like Bitcoin, is a cryptocurrency in which transaction data is broadcast to a public blockchain, similar to Bitcoin. However, it applies exceptionally high-security measures to ensure that users' personal and transaction data is kept totally confidential. Transaction information may be disclosed for a particular reason, such as auditing, using characteristics that are extremely selective in their use. It is a network with very high levels of security.

- **Bitcoin cash**

Bitcoin Cash is included in the cryptocurrency classification as well. The current bitcoin has a block size of 1 MB, which makes it difficult to store a large number of transactions in a single transaction block. The code update was implemented in 2017 to increase the size of the block from 1 MB to 8 MB, which was requested by users. A hard fork was introduced on August 1st, 2017, and the modification was officially implemented on August 1st, 2017. As a result of this modification, the blockchain and cryptocurrency will be divided in two. If someone owed bitcoin at the time of the split, they were also owed the same amount of bitcoin cash units as they owed bitcoin.

- **Bitcoin private**

A user who chooses to utilise Bitcoin Private will have the option of keeping the identity of the sender, recipient, and value of a transaction secret in a particular transaction. This is in contrast to Bitcoin and other cryptocurrencies, in which transactions are transparent and anybody may view the specifics of the transaction if they so want.

6. Problems or Difficulties Associated with Cryptocurrencies

Because bitcoin is creative in all of its endeavours and has achieved a unique position on a worldwide platform, people are happy about its existence; yet, the voyage of cryptocurrency has so far been a roller coaster ride, and it is projected to continue in the near future as well. There are several difficulties linked with cryptocurrencies, which will be described more below. At the moment, bitcoin regulation is considered to be the most important part of the cryptocurrency sector. Some governments have already controlled its usage and transactions in the present financial system, but others are adopting a more cooperative approach to the regulation of this technology in the future. In the absence of international regulation, it will continue to be seen as a criminal activity that should be avoided at all costs.

- **Volatility:** Due to the fact that its regulation is still pending around the world, it will not be regarded as a stable system, and there will be significant variations in its demand and supply, resulting in its volatility in nature, i.e., its value will vary dramatically in a short period of time.

- **Security:** Because it is totally a digital asset, from its creation or mining through transaction, exchange, and storage, everything takes place in digital form, making it vulnerable to security risks at all times, regardless of the situation. Hackers may target any portion of it at any moment, putting its very existence in jeopardy.

- **Cost:** Nothing in life is free, and an item that is solely the result of technological innovation will be more valuable as a result of its rarity. All of the cutting-edge technology that go into it are expensive, therefore there is a cost associated with it**.**

- **People's perception:** Because bitcoin regulation is still pending in many parts of the globe, many people still see cryptocurrency as an illicit mode of payment and are wary of cryptocurrencies potential.

- **Upgradation of technology**: In as much as the whole notion of cryptocurrencies is dependent on technology, and we all know that technology is a very dynamic field, it has to be updated on a regular basis. Upgrades are usually associated with a greater price tag.

- **Theft:** This is also a significant setback for those who possess cryptocurrencies. The storage of cryptocurrency keys poses a significant danger since, if stolen, they cannot be restored, and because it is not totally standardised throughout the world's goods. As a result, theft represents a significant threat to the security of this digital asset.

- **Risk for investors and users**: Despite the fact that it has been around for a decade (since the invention of bitcoins in 2009), cryptocurrency is still in its infancy and has not been widely recognised by the general public.

So yet, no adequate legislation has been created to remove it under a system of rules, regulations, and laws that are consistent with international standards. Consequently, owing to a lack of regulation, it is very volatile, necessitating a high level of risk tolerance among its users and investors [4].

7. How Cryptocurrency is operated?
Cryptocurrencies encrypt sensitive data transfers in order to protect their exchange units, and they do it via cryptographic protocols or very complex coding systems. Advanced mathematics and computer engineering concepts are used by cryptocurrency developers to create these protocols, which are almost hard to breach and consequently impossible to duplicate or counterfeit protected money. This protocol also conceals the identities of bitcoin users, making it more difficult to link transactions and money to specific persons or groups of individuals [4]. Cryptocurrencies are very complicated, as are the source codes and technological controls that underpin and safeguard their operation. Ordinary people, on the other hand, are more than capable of grasping the fundamental principles of cryptocurrencies and becoming knowledgeable cryptocurrency users. Most cryptocurrencies, in terms of functionality, are variants of

Bitcoin, which was the first widely utilised cryptocurrency. In the same way that conventional currencies convey value in units, cryptocurrencies do the same. For example, you may say "I have 10 Bitcoin," which is the same as saying "I have ten rupees."

It is based on three poles, which are as follows:
1. **Mining:** Before placing the next block on the blockchain and claiming a reward, miners must first attempt to solve mathematical problems.

2. **Exchange:** Buying, selling, and trading cryptocurrencies are all possible via an exchange which is often a website.

3. **Wallet:** Cryptocurrency wallets are software applications that contain public and private keys that allow users to send and receive digital currency as well as keep track of their account balances in digital currency.

8. Statistics of Cryptocurrency users in India
Women in India who invest in Bitcoin or other cryptocurrencies surged considerably between December 2020 and March 2021, according to the World Bank. During this time period, the source, who claims to be India's biggest cryptocurrency exchange, claims that the value of bitcoin has increased by 300 percent. This means that almost one in every five consumers is a woman, with the bulk of them falling between the ages of 18 and 34. It is impossible to determine precisely how many users this involves in terms of numbers: Banks were barred from working with cryptocurrency exchanges in 2018, a ban that was overturned in 2020, but which could be reinstated as early as 2021 if the Indian government introduces legislation to prohibit cryptocurrency mining, trading, and holding them as personal assets [5].
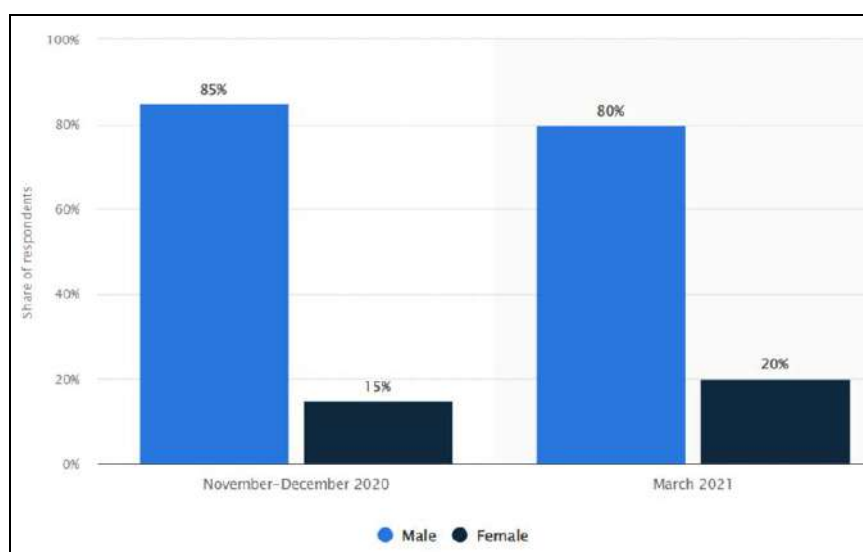
Sources: Statista 2021 [5]

Fig 1: Share of respondents

9. The Economic Impact of Cryptocurrency in India
No one predicted that India would become a crypto-innovation hotbed in the years to come when UnoCoin first debuted there in 2013. Cryptocurrency startups have

developed in metropolitan cities and small towns. Demonetization, the RBI's circular against virtual money, or the Covid-19 pandemic were all failed to halt its spread.
Recently, Indians have pumped 15 million dollars into

cryptocurrency. The economic effect on India's economy is immeasurable. Alternatively, you might say that.

- **It is hard to disregard the possibility that**
Over 300 crypto firms and 60 lakh investors invested a lot of money in India's crypto ecosystem, even in its elementary form. This is when just 2% of Indians utilise cryptocurrency! If supported by the Indian government, it might change the country's economy.

- **Increases the number of jobs available**.
As a consequence of cryptocurrencies, blockchain technology makes it possible to conduct transactions with both unknown and well-known parties. This is an unique skill set that is already in great demand because of the industry's recent growth. Providing assistance to entrepreneurs in general.

- **Work together with the IT sector**
The IT industry in India is renowned for its sturdiness and resiliency. There are many ways to strengthen the blockchain network in the United States, which will result in an infusion of money from outside. Who knows how AI and the Internet of Things (IoT) will merge with blockchain now that they've passed the embryonic stage? That would be an ideal setting for the next generation of tech giants.

- **There is no need for intermediaries**
The elimination of intermediaries is one of the many advantages of a decentralised system. Because of the instantaneous and traceable nature of digital transactions, there is no room for corruption. If only new laws and policies were put in place by the government [6, 7].

10. The Reserve Bank of India and Cryptocurrency
The Reserve Bank of India has issued a strong warning against the use of digital currency for money laundering and terrorism funding. Even the Supreme Court seems to believe that the worldwide phenomenon is a positive development. While data security is a concern, it is far from impregnable.
The usage of cryptocurrencies in the nation is currently unregulated, and there is no prohibition against their use.
It should be mentioned that on March 4, 2021, the Supreme Court overturned an RBI circular issued on April 6, 2018, which prohibited banks and companies regulated by the RBI from providing services in connection with virtual currencies (including bitcoin).
The Reserve Bank of India has repeatedly expressed its strong opposition to cryptocurrencies, claiming that they pose serious threats to the country's macroeconomic and financial stability. The bank has also expressed scepticism about the number of investors who trade in cryptocurrencies, as well as about their claimed market value [8].
There are rumours that the Reserve Bank of India is working on a gradual implementation of its own digital currency. A CBDC is a digital form of legal money issued by a central bank that serves as legal tender. It functions in the same way as fiat money and may be exchanged for fiat cash on a one-to-one basis. The only difference is in the way it is presented.

11. Conclusion
Many activities in our everyday lives have been integrated online and have become more flexible and effective as a result of the fast development of information and communication technology. There has been a massive increase in the number of people using the internet, which has activated virtual word ideas and spawned a new commercial phenomenon cryptocurrencies.
Cryptocurrencies are valuable and intangible things that may be utilised electronically in a variety of applications and networks, including online social networks, online social games, virtual worlds, and peer-to-peer networks. In recent years, virtual money has been widely used in a variety of systems. In this study, we look at what cryptocurrency users think will happen in the future. When it comes to dealing with bitcoin, it also examines the level of trust that consumers have in their ability to do so. In addition, the article aims to measure the expansion of bitcoin usage in order to provide a clear picture from a practical perspective. The notion of cryptocurrency has a bright future ahead of it, with additional potential for good change and advancement in the e-business and e-payment sectors expected to emerge. Because of the quick growth and improvement of technology, cryptocurrency will continue to advance in the future. Since our research was completed, there have been significant strides forward in the improvement and expansion of the cryptocurrency concept. Sellers are increasingly accepting payments in the form of various sorts of cryptocurrencies, owing to the fact that more and more people are becoming aware of the potential and possibilities that cryptocurrency may provide. Meanwhile, it has a plethora of advantages and disadvantages, as well as challenges.

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