International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Assessing the Economic Impact and Regulatory Framework of Blockchain-Enabled Digital Assets in India's Digital Economy

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Abstract:
Blockchain technology has emerged as a transformative force in the digital asset ecosystem, providing unmatched transparency, security, and efficiency. In India the rapid growth of the digital economy has fueled the widespread adoption of digital assets, with blockchain playing a crucial role in this transformation. The digital asset market in India has seen remarkable growth, generated significant revenue and spurring financial innovation. As of 2024, the average revenue per user (ARPU) in the sector is estimated at USD 2.09, reflecting its expanding adoption across a diverse user base. This paper explores the diverse applications of blockchain in India's digital asset ecosystem, including cryptocurrencies, tokenized assets, decentralized finance (DeFi), and smart contract platforms. Blockchain addresses key challenges in traditional financial systems, such as fraud, inefficiency, and lack of transparency, by enabling secure and efficient asset management. The study also analyzes revenue trends and the economic impact of blockchain-driven digital assets, highlighting their contribution to the Indian economy. Additionally, the paper investigates India's evolving regulatory landscape, examining policy developments and their impact on the adoption of blockchain and digital assets. The findings provides valuable insights for policymakers, businesses, and investors looking to harness blockchain for economic growth and financial inclusion.

Keywords: Blockchain Technology, Digital Assets, Decentralized Finance (DeFi), Tokenized Assets, cryptocurrency.

1. INTRODUCTION

India has officially recognized **Digital Assets** under Section 47(A) of the Income Tax Act, 1961. The Finance Act 2022-23 introduced the term **"Virtual Digital Assets" (VDA)**, which refers to any information, code, number, or token created through cryptographic methods or other means, representing value that can be exchanged with or without consideration. A VDA must have inherent value, function as a store of value or a unit of account, and be usable in financial transactions or investments. These assets can be stored, transferred, or traded in electronic formats.

Indian regulators have taken a cautious approach to digital assets. In 2018, the Reserve Bank of India (RBI) issued a directive against cryptocurrency transactions. However, this ban was overturned by the Supreme Court of India in 2020. The introduction of the Cryptocurrency and Regulation of Official Digital

Currency Bill, 2021 marked a significant step toward establishing a legal framework for the issuance of a central bank-backed digital currency (CBDC) by the RBI. While certain digital assets, such as CBDCs and blockchain-based financial applications, show promise, a blanket ban has been placed on private cryptocurrencies.

In recent developments, the landscape is evolving as the RBI plans to launch a CBDC, offering a state-supported digital currency as an alternative to cash, within a structured regulatory framework. This initiative aims to strike a balance between state control and innovation while ensuring investor protection through stringent regulations, including anti-money laundering (AML) and know-your-customer (KYC) measures to reduce risks and enhance security.

Objectives

1. To assess the revenue trends and economic contributions of blockchain-enabled digital assets to India's growing digital economy.
2. To investigate India's regulatory framework for blockchain and digital assets.

2. REVIEW OF LITERATURE

Studies (e.g., Nakamoto, 2008; Mougayar, 2016) highlight blockchain as a decentralized ledger enabling trustless transactions by removing intermediaries. This technology underpins digital assets by providing transparency, immutability, and security.

Blockchain-enabled smart contracts automate asset management processes, ensuring compliance and reducing disputes. Studies (e.g., Szabo, 1997; Buterin, 2014) highlight their role in escrow services, automated dividends, and secure asset transfers.

Blockchain's cryptographic nature ensures data integrity, making it ideal for preventing fraud in digital asset transactions (Wüst & Gervais, 2018)

Soni and Sharma (2023) note that India's regulatory stance on blockchain-based digital assets has been cautious. The RBI initially banned cryptocurrency transactions in 2018 due to financial stability concerns, but the Supreme Court lifted the ban in 2020, enabling wider adoption. However, the regulatory landscape remains unclear, particularly for cryptocurrencies like Bitcoin and Ethereum, which are not considered legal tender.

3. RESEARCH METHODOLOGY

The present study employs a descriptive research design to analyze the economic impact of blockchain-enabled digital assets and evaluate India's regulatory framework.

Sources of Data: Secondary Data: Market insights (Statista, Industry reports - Deloitte, PWC)

Period of the Study: The analysis covers the period 2017–2028, including historical data and future projections.

Statistical Tools Used: Descriptive Statistics

Percentage Change: To measure year-over-year growth or decline in revenue and user engagement, Time Series Analysis: To observe historical and projected revenue trends (2017–2028) in blockchain-related markets.

Types of Digital Assets:

Cryptocurrencies: These are digital or virtual currencies that primarily operate on blockchain technology. They are commonly used for financial transactions, as investment assets, and for transferring value internationally. However, their prices can fluctuate significantly, and regulations differ from one region to

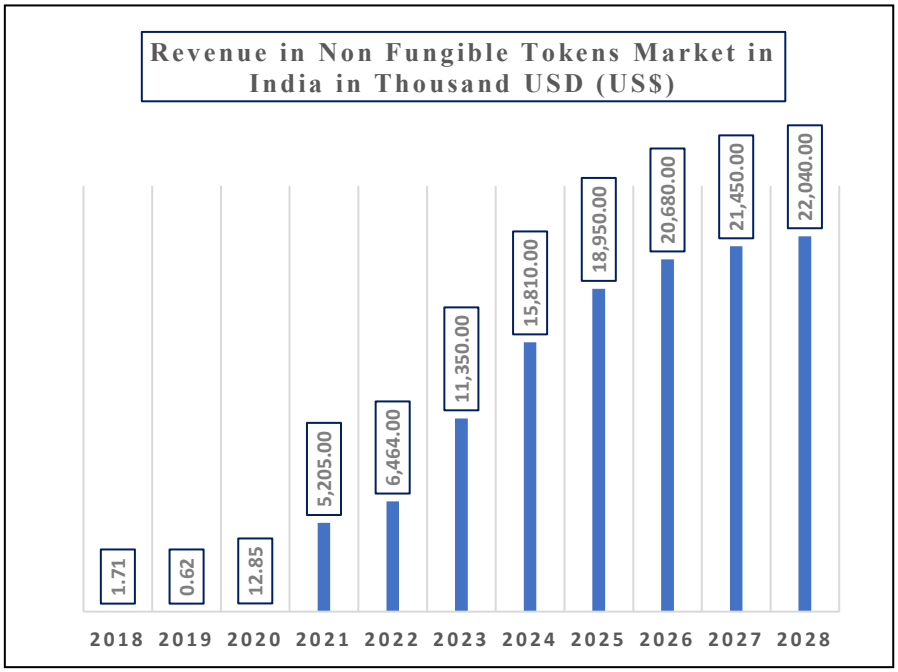
another. Users should exercise caution and thoroughly research before engaging in any cryptocurrency-related activities.

Non-Fungible Tokens (NFTs): NFTs are unique digital assets built on blockchain technology that serve as proof of ownership or authenticity for a specific asset or piece of content. Unlike cryptocurrencies such as Bitcoin and Ethereum, which are fungible and can be exchanged on a one-to-one basis, NFTs are non-fungible, meaning each token is distinct and cannot be replaced or exchanged for another identical token.

Decentralized Finance (DeFi): DeFi is a blockchain-driven financial system that operates without traditional intermediaries like banks or brokers. Instead, it leverages smart contracts—self-executing programs that automatically facilitate and enforce financial transactions.

4. DATA ANALYSIS & DISCUSSION

REVENUE TRENDS:



Revenue in Non-Fungible Tokens market in India

Revenue in Non-Fungible Tokens market in India[1]	
Year	**in thousand USD (US$)**
2018	**1.71**
2019	**0.62**
2020	**12.85**
2021	**5,205.00**
2022	**6,464.00**
2023	**11,350.00**

[1]NFT - India. (n.d.). Retrieved October 28, 2024, from https://statista-nassdoc.refread.com/outlook/dmo/fintech/digital-assets/nft/india

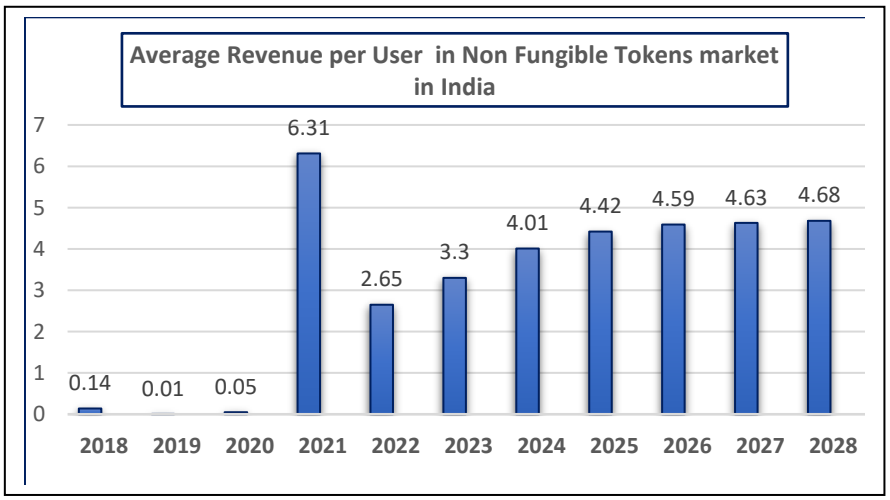
2024	**15,810.00**
2025	**18,950.00**
2026	**20,680.00**
2027	**21,450.00**
2028	**22,040.00**

Source: Statista Market Insights

Discussion & Analysis:

The NFT (Non-Fungible Token) market in India has grown rapidly over the years, especially since 2021. From 2018 to 2020, the revenue was very small, staying below $15,000, as the market was still new, and few people knew about NFTs. In 2021, the market took off, with revenue jumping to $5.2 million—a huge increase from 2020. This growth was fueled by global interest in NFTs, support from celebrities, and their use in areas like art, gaming, and digital collectibles. The trend continued, with revenue reaching $6.46 million in 2022 and more than doubling to $11.35 million in 2023, as more people started using NFTs for various purposes, including virtual worlds and sports items.

In the coming years, the market is expected to keep growing steadily, reaching $22.04 million by 2028. While the fast growth seen in 2021-2023 may slow down, the market will continue to expand as more people understand NFTs and as technology improves. However, there are challenges like changes in regulations, price swings, and the market eventually becoming crowded. Despite these issues, NFTs are becoming an important part of India's digital economy and have a bright future ahead.



Average Revenue per User in Non-Fungible Tokens market in India[2]

Average Revenue per User in Non-Fungible Tokens market in India	
Year	**in USD (US$)**
2018	**0.14**
2019	**0.01**
2020	**0.05**
2021	**6.31**

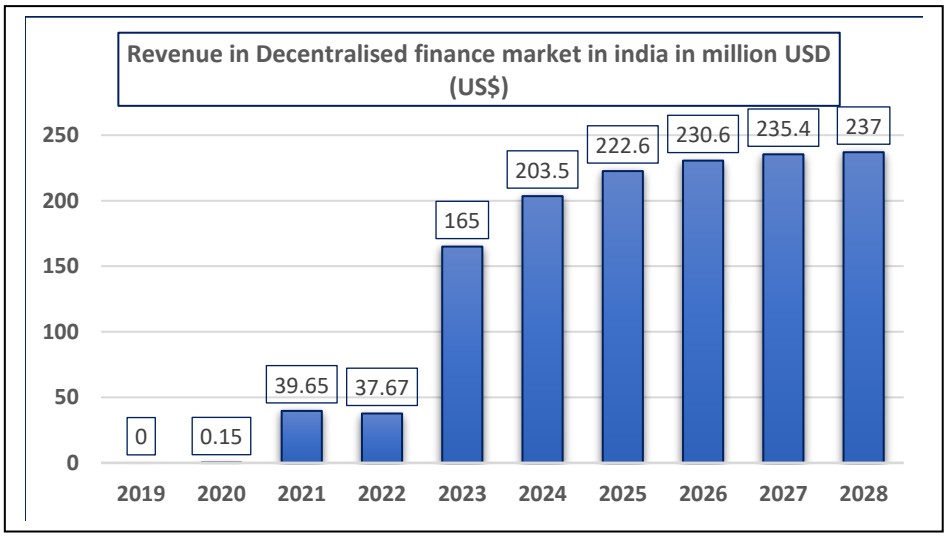
[2] NFT - India. (n.d.). Retrieved October 28, 2024, from https://statista-nassdoc.refread.com/outlook/dmo/fintech/digital-assets/nft/india

2022	**2.65**
2023	**3.3**
2024	**4.01**
2025	**4.42**
2026	**4.59**
2027	**4.63**
2028	**4.68**

Source: Statista Market Insights

Discussion & Analysis:

In the early years (2018-2020), the average revenue per user in India's NFT market was very low, showing that only a few people were spending money on NFTs. In 2021, user spending shot up to $6.31 as NFTs became popular, but this slowed down in 2022 when ARPU dropped to $2.65. Since then, ARPU has been growing steadily, and it is expected to reach $4.68 by 2028 as the market becomes stable and users continue spending on NFTs in areas like art, gaming, and collectibles. This pattern shows how the market is shifting from a high-growth phase to a steady and mature stage.



Revenue in Decentralized finance market in India [3]

Revenue in Decentralized finance market in India	
Year	**in million USD (US$)**
2019	**0**
2020	**0.15**
2021	**39.65**
2022	**37.67**
2023	**165**
2024	**203.5**
2025	**222.6**

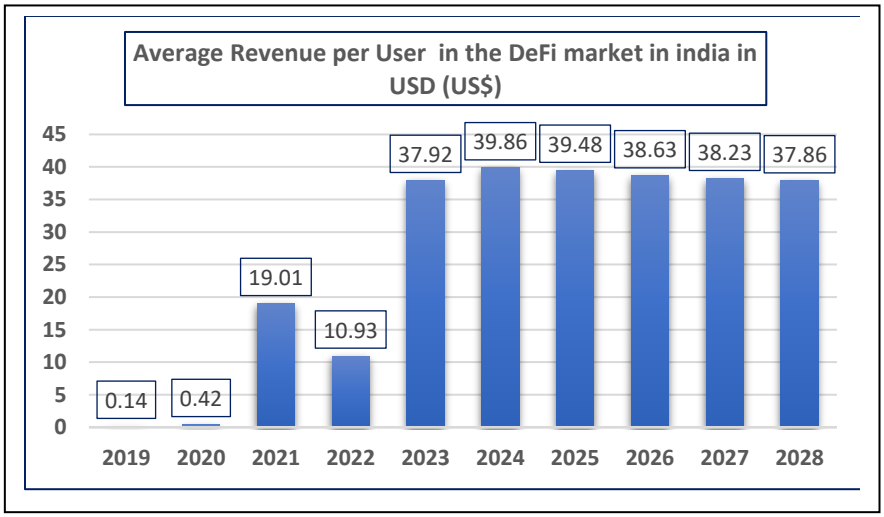
[3] DeFi - India. (n.d.). Retrieved October 27, 2024, from https://statista-nassdoc.refread.com/outlook/dmo/fintech/digital-assets/defi/india

2026	**230.6**
2027	**235.4**
2028	**237**

Source: Statista Market Insights

Discussion & Analysis:

The growth of decentralized finance (DeFi) in India, with revenues rising to $237 million USD, shows its increasing importance in the country's financial system. Starting small, the market grew quickly as people and businesses began using blockchain-based services for cheaper, faster, and more accessible financial solutions. DeFi has the potential to improve financial inclusion by reaching underbanked and rural populations and encouraging innovation in technology and finance. It also creates new ways to invest and earn, such as staking and yield farming, while making cross-border payments easier and more efficient. However, the growth has started to slow, which may be due to regulatory uncertainty, security risks, or a maturing market. With proper rules and awareness, DeFi could boost India's economy, generate tax revenue, and help build a more modern and inclusive financial system.



Average Revenue per User in the DeFi market in India[4]

Average Revenue per User in the DeFi market in India	
Year	**in USD (US$)**
2019	**0.14**
2020	**0.42**
2021	**19.01**
2022	**10.93**
2023	**37.92**
2024	**39.86**
2025	**39.48**
2026	**38.63**

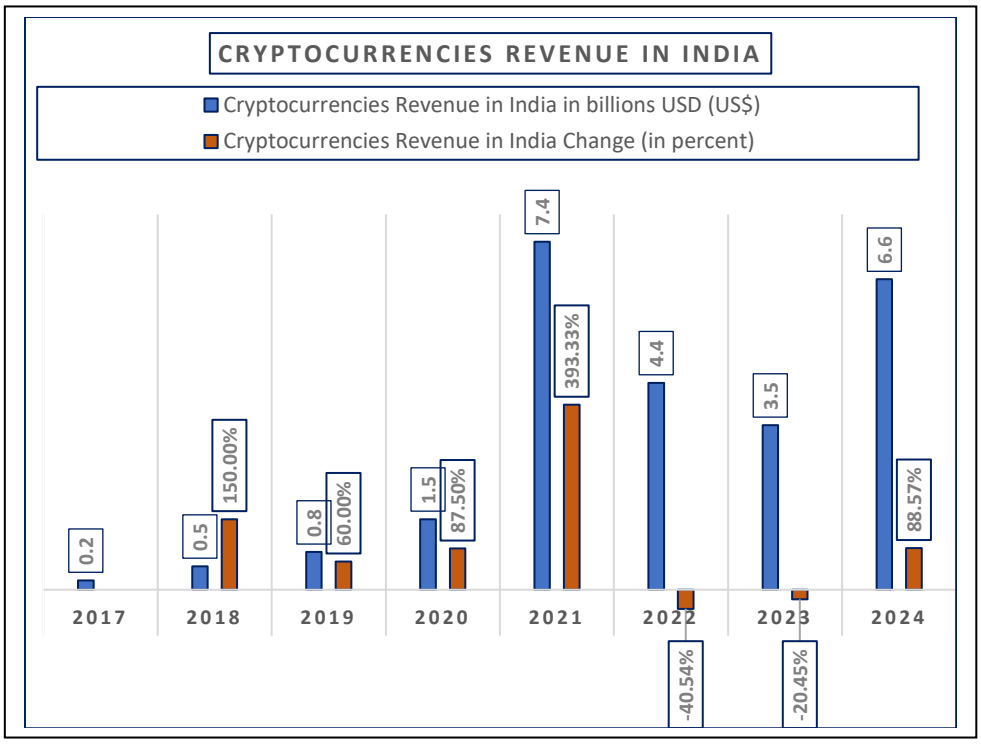
[4] DeFi - India. (n.d.). Retrieved October 27, 2024, from https://statista-nassdoc.refread.com/outlook/dmo/fintech/digital-assets/defi/india

2027	**38.23**
2028	**37.86**

Source: Statista Market Insights

Discussion & Analysis:

The table shows the Average Revenue Per User (ARPU) in the Decentralized Finance (DeFi) market in India from 2019 to 2028, in USD. In 2019 and 2020, the ARPU was very low at $0.14 and $0.42, indicating that DeFi adoption in India was in its early stages, with limited users and engagement. In 2021, ARPU saw a significant jump to $19.01, reflecting rapid growth in user activity and the adoption of DeFi services, likely fueled by increasing awareness and the rise of blockchain technologies. However, this figure dropped to $10.93 in 2022, which might indicate market adjustments, increased competition, or a decrease in transaction volumes due to external factors like market volatility or regulatory uncertainties. From 2023 onward, the ARPU stabilizes at higher levels, peaking at $39.86 in 2024, before gradually tapering off to $37.86 by 2028. This stabilization suggests a maturing market where the user base expands, but individual transaction sizes or volumes per user begin to level out. The steady ARPU indicates consistent engagement with DeFi platforms, highlighting their growing importance in India's financial ecosystem.



Cryptocurrencies Revenue in India[5]

Cryptocurrencies Revenue in India		
Year	**in billions USD (US$)**	**Change (in percent)**
2017	0.2	--
2018	0.5	150.00%

[5] Cryptocurrencies - India. (n.d.). Retrieved October 16, 2024, from https://statista-nassdoc.refread.com/outlook/fmo/digital-assets/cryptocurrencies/india?currency=USD

2019	0.8	60.00%
2020	1.5	87.50%
2021	7.4	393.33%
2022	4.4	-40.54%
2023	3.5	-20.45%
2024	6.6	88.57%

Source: Statista Market Insights

Discussion & Analysis:

Rapid Growth Phase (2017-2021):

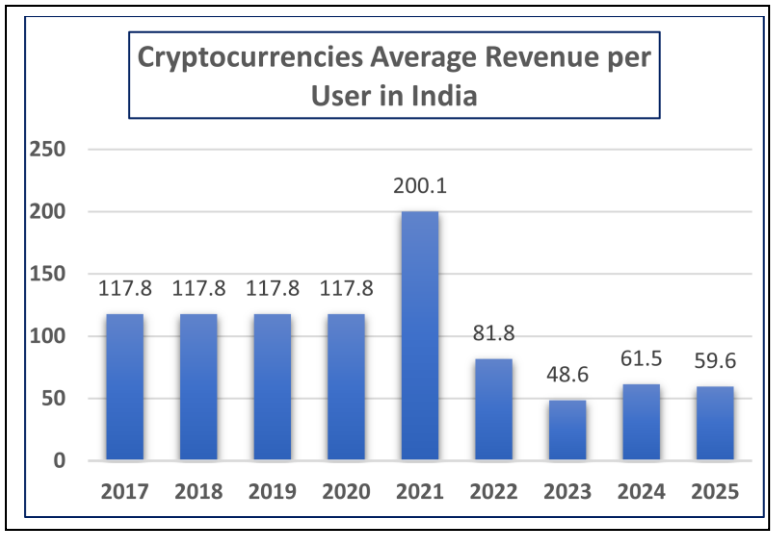
- **2018-2020**: India's cryptocurrency revenue saw consistent growth, with significant percentage increases each year (+150% in 2018, +60% in 2019, and +87.5% in 2020).
- **2021**: A sharp rise of +393.33% took revenue to $7.4 billion. This aligns with the global cryptocurrency boom, where interest in digital assets reached new heights.

Decline Phase (2022-2023):

- **2022**: Revenue dropped by -40.54% to $4.4 billion. This decline was likely due to market corrections and regulatory uncertainties, leading to lower investor confidence.
- **2023**: Another drop of -20.45% brought revenue down to $3.5 billion. This period reflects a sustained cool-off in the market as investors adjusted to recent volatility.

Recovery and Stabilization (2024-2025):

- **2024**: A recovery phase, with an increase of +88.57% taking revenue to $6.6 billion. This may suggest a resurgence of interest as the market stabilizes.



Cryptocurrencies Average Revenue per User in India

Cryptocurrencies Average Revenue per User in India	
Year	**Average revenue**
2017	117.8
2018	117.8
2019	117.8
2020	117.8

2021	200.1
2022	81.8
2023	48.6
2024	61.5
2025	59.6

Source: Statista Market Insights

Discussion & Analysis:

Trend Overview (2017–2025):

- **2017–2020:** The ARPU remained stable at **117.8** during these four years, indicating a lack of significant market dynamics or growth in this period.
- **2021:** A sudden spike to **200.1** suggests a surge in user revenue, likely driven by factors such as increased adoption, market rallies, or government inaction on strict regulations during the crypto boom.
- **2022–2023:** Sharp declines to **81.8** and then **48.6** reflect a steep downturn, likely linked to market corrections, regulatory challenges, or declining investor confidence post-crypto crashes.
- **2024–2025 (Projected):** A slight recovery is expected, with ARPU forecasted at **61.5** and **59.6**, suggesting stabilization but not a return to previous highs.

Economic Impact:

Booming Period (2021):

The rise in ARPU could indicate:

- Increased speculative investments due to crypto market euphoria.
- Higher transaction volumes driven by widespread adoption among younger demographics and tech-savvy individuals.
- Increased revenues for exchanges, wallets, and associated businesses, benefiting the broader fintech ecosystem.

Stabilization (2024–2025):

The moderate recovery hints at a maturing market:

- Likely driven by clearer regulatory frameworks that could restore confidence.
- Institutional adoption or niche uses like cross-border remittances might sustain revenue levels.
- However, growth seems limited, implying crypto's shift to a more stable but less speculative phase.

Macro-Economic Implications for India:

- **Wealth Distribution:** The crypto boom likely widened wealth disparities, as early adopters gained significantly, while late entrants suffered losses during the bust.
- **Regulatory Landscape:** Volatile ARPU highlights the need for robust policies to protect retail investors and prevent destabilization of traditional financial markets.
- **Innovation and Jobs:** The sector's growth spurred innovation in blockchain technology and fintech, creating high-skill jobs despite market volatility.
- **Capital Flight Risk:** Unregulated crypto investments could lead to capital outflows, affecting currency stability.

Regulatory Framework for Blockchain and Digital Assets in India

Cryptocurrency Status in India (2024):

India's stance on cryptocurrency remains complex. The 2021 "Cryptocurrency and Regulation of Official Digital Currency Bill" signaled intent to regulate the sector, though it has not yet passed. Cryptocurrencies like Bitcoin and Ethereum are not legal tender, and no licensing framework exists for operators. While the RBI's 2018 banking ban was overturned by the Supreme Court in 2020, enabling banks to service crypto exchanges, the regulatory environment continues to evolve, aiming to balance innovation and oversight.

Overview of Cryptocurrency Regulations in India:

Taxation on Cryptocurrency Gains:

30% Tax: The government imposes a 30% tax and a 4% cess on income earned from the transfer of cryptocurrencies. This applies to any profits from the sale or exchange of digital assets.

1% TDS: A 1% Tax Deducted at Source (TDS) is levied on cryptocurrency transactions exceeding Rs 10,000 annually, or Rs 50,000 for specified individuals.

No Deductions: Taxpayers cannot claim deductions for trading-related expenses or losses, except for the acquisition cost of the cryptocurrency.

Crypto Travel Rule Implementation in India (2023):

1. **PMLA Applicability**: Virtual Digital Assets (VDAs), including cryptocurrencies, were brought under the Prevention of Money Laundering Act (PMLA).
2. **FATF Alignment**: India adopted the Travel Rule to meet global AML and CFT standards.
3. **Key Requirements for Service Providers (SPs)**:

Include accurate originator and beneficiary information in VDA wire transfers.

Monitor for missing information and conduct screenings.

4. **Obligations**:

Originating SPs: Collect and securely share required details (e.g., PAN, wallet address) with beneficiary SPs and authorities.

Beneficiary SPs: Verify and maintain originator and beneficiary details.

5. **Data Points**:

Information includes PAN, names, wallet addresses, and physical addresses of originators and beneficiaries.

This ensures stricter oversight and compliance in VDA transactions.

The Outlook for Cryptocurrency Adoption in India:

India's cryptocurrency adoption shows promise but hinges on regulatory clarity. Growing user interest indicates potential, while balanced regulations and the RBI's digital currency could drive integration. The crypto Travel Rule implementation marks progress, but broader adoption depends on the evolving legal landscape.

Findings

1. Economic Contribution: Blockchain technology is significantly driving the growth of India's digital economy. Revenue from digital assets, such as cryptocurrencies, NFTs, and DeFi, demonstrates steady growth, contributing to innovation and financial inclusion.

2. Market Trends: The NFT and DeFi markets are expanding, with revenue and Average Revenue Per User (ARPU) stabilizing after early rapid growth phases. Cryptocurrencies show a volatile trajectory, with periods of sharp growth followed by declines due to market corrections and regulatory uncertainty.
3. Regulatory Challenges: India's regulatory framework for blockchain and digital assets remains a work in progress. The lack of clear licensing and stringent taxation policies, like the 30% tax on crypto gains and 1% TDS, impacts market participation.
4. Blockchain Applications: Blockchain technology addresses inefficiencies in traditional systems, offering solutions for fraud prevention, secure transactions, and decentralized finance. Its use in cross-border payments, digital identity, and tokenized assets illustrates its transformative potential.
5. Evolving Legal Landscape: The introduction of the RBI's Central Bank Digital Currency (CBDC) and the application of the Prevention of Money Laundering Act (PMLA) to digital assets highlight progress in aligning with global standards.

SUGGESTIONS

1. Strengthen Regulatory Frameworks: Develop transparent and balanced regulations to foster innovation while protecting consumers and ensuring compliance with international norms.
2. Promote Blockchain Literacy: Conduct educational campaigns for the public and policymakers to enhance understanding and adoption of blockchain technology.
3. Incentivize Startups: Provide tax benefits and grants for blockchain-based startups to encourage innovation and investment in the sector.
4. Integrate Blockchain in Key Sectors: Expand the use of blockchain in industries such as healthcare, logistics, and education to drive broader adoption and economic impact.
5. Enhance Security Measures: Enforce robust AML and KYC standards to build trust and safeguard against misuse of digital assets.

CONCLUSION

Blockchain technology holds immense potential to transform India's digital asset ecosystem by addressing inefficiencies, enhancing transparency, and driving financial inclusion. While significant progress has been made, particularly in sectors like DeFi and NFTs, the growth trajectory is tempered by regulatory uncertainties and market volatility. A well-defined and supportive regulatory framework, coupled with efforts to educate stakeholders and incentivize innovation, can position India as a global leader in blockchain adoption. By leveraging blockchain for economic growth and modernizing financial systems, India can unlock new opportunities for its digital economy, ensuring sustainable development and financial inclusivity.

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