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CRYPTOCURRENCY: A TOOL FOR ECONOMIC MPOWERMENT OR REGULATORY NIGHTMARE?

Gunjan Chopra

Abstract

Across the world, cryptocurrency is changing lives and raising tough questions. In Nigeria, everyday people use digital coins to protect their savings and find new ways to do business. In India, a farmer hears about the Digital Rupee and wonders if it might finally bring banking to his village—or if it will just mean more rules and government watchfulness. Meanwhile, leaders in New Delhi try to find the right balance, learning from the bold moves of countries like El Salvador and the careful steps of the European Union. This research tells the story of how cryptocurrency can be both a tool for empowerment and a source of risk. It follows real examples where digital money has helped people escape poverty or reach new markets, but also where it has made it easier for criminals to hide their tracks. India's own journey is full of twists—bans, court battles, and new ideas like the Digital Rupee—showing just how hard it is to get the balance right.

Along the way, the paper looks at global lessons: how some countries have leapt ahead, while others have faced setbacks and surprises. It also highlights how blockchain is being used for good, like sending aid to refugees or helping charities work more openly. Instead of giving a simple answer, this research shows that the real impact of cryptocurrency depends on how it's managed. With the right rules, education, and teamwork, digital money can open doors for millions. But without care, it can just as easily create new problems. This is the story of a technology at a crossroads—and of the choices that will shape the future of money for everyone.

I. Introduction: The Dual Edges of Cryptocurrency

A. The Dual Edges of Cryptocurrency: Nigeria's Lifeline vs. Pakistan's Threat

The COVID-19 pandemic exposed the fragility of global financial systems, accelerating the rise of cryptocurrencies as both a *lifeline for the underserved* and a *tool for illicit actors*. In **Nigeria**, where hyperinflation and currency devaluation have eroded trust in the Naira(basic monetary unit of Nigeria), *cryptocurrencies like Bitcoin and Tether (USDT*) have become indispensable**. Over 32% of Nigerians** now use digital assets to hedge against inflation, send low-cost remittances, and access global markets, with platforms like *Binance P2P slashing* cross-border transaction fees from **36% to 1–2%**. Individuals such as **Tola Fadugbagbe**, a Lagos-based entrepreneur, have transformed their lives through *Bitcoin trading*, moving from poverty to financial independence and even founding educational platforms like *Crypto Masterclass* to empower others. The **Nigerian government**, recognizing both the risks and opportunities, has shifted from outright bans to regulated acceptance, with the **Investments and Securities Act, 2024** explicitly recognizing digital assets as securities and bringing crypto exchanges under regulatory oversight.[1]

Yet, just **6,500 kilometers** away in **Pakistan**, the same technology fuels *terror financing*. In 2022, USDT (Tether) transactions linked to banned groups **surged by 240%,** with *ISIS-K* and the *al-Azaim Foundation* exploiting the *Tron blockchain's* speed and opacity to fund propaganda and recruit fighters. A Karachi-based student funneled ₹2.7 million ($9,000) via WhatsApp-based crypto exchanges to terror networks, underscoring the dark side of decentralized finance. ***A United Nations report revealed that $2.8 billion was laundered through crypto exchanges in 2019,*** highlighting the scale of the problem. This duality lies at the heart of the cryptocurrency debate: *a technology that empowers marginalized communities also empowers criminals***.** The global crypto market, now valued at over $2.2 trillion, reflects this paradox.[2]

The promise of decentralization and anonymity, which make cryptocurrencies so appealing for financial inclusion, also complicates law enforcement and regulatory oversight. **In India,** the **Reserve Bank of India (RBI)** initially imposed a ban on banks dealing with crypto transactions in 2018, citing risks to financial stability. However, the **Supreme Court** overturned this ban in 2020, opening the doors for crypto operations—albeit in a regulatory grey zone.[3] The pseudonymous nature of cryptocurrency transactions makes tracing illicit activities exceedingly difficult, posing significant challenges for regulators and law enforcement agencies.[4]

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[1]Crypto for Innovation, "*Crypto in Nigeria: Surge in Adoption and Regulatory Shifts*", https://cryptoforinnovation.org/crypto-in-nigeria-surge-in-adoption-and-regulatory-shifts/.
[2] OSL, "*How Global Crypto Regulations Are Evolving in 2025*", https://www.osl.com/hk-en/academy/article/how-global-crypto-regulations-are-evolving-in-2025.
[3]Tulja Legal, "*Challenges of Regulating Bitcoin and Cryptocurrency in India*", https://tuljalegal.in/blog/challenges-of-regulating-bitcoin-and-cryptocurrency-in-india.
[4] Muffliha Sadaf & T. Vaishali, "*Crypto Crimes: Legal Challenges and Regulation of Cryptocurrency in India*", 5 Int'l J. Res. Publ'n & Revs. 3930, 3930–3935 (2024), https://ijrpr.com/uploads/V5ISSUE12/IJRPR36609.pdf.

B. India's Crossroads: Innovation vs. Control

India stands at a pivotal juncture in this global narrative. Since the RBI's first crypto advisory in 2013, the country has oscillated between skepticism and cautious acceptance. **The 2018 banking ban**, which barred financial institutions from servicing crypto businesses, nearly crippled the industry until the Supreme Court overturned it in 2020, citing constitutional rights to trade. By 2021, the government introduced a 30% tax on crypto gains and a 1% TDS on transactional move that legitimized digital assets while stifling speculative trading.[5] The Ministry of Corporate Affairs amended reporting requirements, mandating companies to disclose their crypto holdings and transactions, further institutionalizing the sector.[6]

In 2002 India launched its **Central Bank Digital Currency (CDBC)**, the Digital Rupee (e₹), positioning itself as a leader in blockchain innovation among emerging economies. The e₹ pilot, designed to streamline payments and reduce cash dependency, has already attracted five million users by 2024. Yet, regulatory ambiguity persists. The Cryptocurrency and Regulation of Official Digital Currency Bill, 2021—which proposes that banning private cryptocurrencies— remains stalled, leaving investors and businesses in limbo. As **SEBI Chairperson Tuhin Kanta** Pandey has clarified, any decision on crypto regulation must come from the central government, not the market regulator, and India remains cautious while awaiting global coordination. India's challenges mirror its socio-economic complexities. Urban centers like Mumbai and Bengaluru drive crypto adoption, but 65% of the population in rural areas—where internet penetration lags at 50%—risks being excluded. The environmental cost of crypto mining, reliant on coal-dependent regions, clashes with India's climate goals, **emitting 22–22.9 million metric tons** of CO_2 annually. Security breaches like the $230 million WazirX hack and rural- targeted scams highlight systemic vulnerabilities.[7]

Globally, nations are charting divergent paths. El Salvador's 2021 adoption of Bitcoin as legal tender, despite 68% public opposition, contrasts with China's outright ban on crypto trading. The EU's Markets in Crypto-Assets (MiCA) framework prioritizes consumer protection, while the U.S. grapples with regulatory fragmentation.[8] For India, the stakes are existential: Will harness blockchain for inclusive growth, or will regulatory paralysis allow crypto to deepen existing divides?

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[5]CNBC-TV18, "*As India Prepares New Crypto Policy, Here's What Other Countries Are Doing"*, https://www.cnbctv18.com/market/cryptocurrency/as-india-prepares-new-crypto-policy-heres-what-other-countries-are-doing-sebi-rbi-ws-l-19608887.htm.

[6] Legal, supra note 3.

[7] Id.

[8] OSL, "*How Global Crypto Regulations Are Evolving in 2025"*, https://www.osl.com/hk-en/academy/article/how-global-crypto-regulations-are-evolving-in-2025.

C. Research Question and Framework

This paper seeks to answer a central question: *Can cryptocurrencies empower economies like India's without compromising regulatory control?* **To explore this, we analyze:**

1. **Technical Foundations**: How do blockchain's decentralization and consensus mechanisms enable both empowerment and risk?
2. **Global Case Studies**: What lessons can India learn from Nigeria's inclusion successes and Pakistan's terror financing challenges?
3. **Regulatory Models**: How do frameworks like MiCA and El Salvador's Bitcoin law inform India's approach?
4. **India's Journey**: Can the Digital Rupee bridge the urban-rural divide, or will it centralize financial control?

The urgency of these issues is heightened by the current state of cryptocurrency regulation in India. Despite the imposition of a **30% tax on crypto gains and a 1% TDS on transactions**, there is still no comprehensive law recognizing or regulating digital assets as legal tender or investment instruments.[9] The **Cryptocurrency and Regulation of Official Digital Currency Bill, 2021**, remains stalled, fueling uncertainty for investors, innovators, and consumers. The lack of regulatory clarity means there are no dedicated investor protection mechanisms or grievance redressal systems, exposing users to sudden policy changes and potential legal crackdowns.[10]

The environmental impact of crypto mining—particularly in coal-dependent regions—raises important questions about the sustainability of digital finance, while the urban-rural digital divide threatens to exacerbate existing inequalities. Globally, the cryptocurrency market has exploded to a capitalization of over **$2.2 trillion by 2025**, with more than 600 major cryptocurrency and millions of tokens in circulation. Countries are responding in markedly diverse ways, and India's choices now will determine whether cryptocurrency becomes a force for inclusive growth or a source of instability and division.[11]

This research paper aims to provide a comprehensive analysis of the technical, economic, regulatory, and social dimensions of cryptocurrency in India, drawing on global lessons and local realities to offer actionable policy recommendations for the future. As the RBI navigates this complex terrain, collaboration with global bodies like the Financial Stability Board (FSB) and private-sector innovators will be critical. Cryptocurrency is not a panacea— nor is it a plague. It is a mirror, reflecting both the promise of financial democracy and the perils of

[9] TV18, supra note 5.
[10] Legal, supra note 3.
[11] Osl, supra note 2.

unbridled decentralization. India's task is to tilt the balance toward empowerment, ensuring that the benefits of blockchain reach the many, not just the few.[12]

II. Blockchain's Dual Promise: Empowerment Tools vs. Regulatory Risks

A. Decentralization: Democratizing Finance or Enabling Illicit Flows?

Blockchain technology revolutionizes financial systems by enabling direct, peer-to-peer transactions without intermediaries. Its decentralized architecture distributes data across a global network of nodes, eliminating single points of failure and making the system censorship- resistant and democratic in transaction validation.[13] In developing economies like Nigeria, blockchain has empowered millions of unbanked citizens to access financial services, bypassing traditional banking infrastructure and reducing transaction costs.[14] Platforms such as **Binance P2P and Paxful** allow users to transfer funds at much lower fees than traditional services, fostering financial inclusion for marginalized communities. Blockchain's immutability—its resistance to tampering—further enhances transparency and trust, as every transaction is cryptographically hashed and permanently recorded.[15]

However, decentralization also complicates regulatory oversight. The absence of a central authority makes it difficult for law enforcement to trace illicit activities. In Pakistan, terror groups exploit blockchain's anonymity to move funds via cryptocurrencies, evading traditional financial surveillance.[16] The operational ease, anonymity, and decentralization of cryptocurrencies make them a preferred medium for terrorist organizations, as highlighted by the use of digital assets by groups such as the **Islamic State of Khorasan (IS-K)** and **Tehreek Taliban Pakistan (TTP)**. Blockchain's pseudonymous nature and decentralized structure allow criminals to automate thousands of low-cost transfers, obscuring the origins and movement of illicit funds.[17] The rise of **decentralized finance (DeFi)** platforms has introduced new avenues for money laundering, as these platforms operate without traditional intermediaries or identity verification, making it challenging to identify and trace the flow of funds.[18]

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[12] Kolluru Sai Surya & S. Venkata Ramana, "*Role of Cryptocurrency in the Modern Financial Markets*", 6 International Journal of Research Publication and Reviews 5010, 5010–5016 (2025), https://ijrpr.com/uploads/V6ISSUE2/IJRPR39186.pdf.

[13] CoinTrust, *Nigeria Leads Africa in Blockchain-Powered Financial Innovation*, https://www.cointrust.com/market-news/nigeria-leads-africa-in-blockchain-powered-financial-innovation (last visited May 31, 2025).

[14] Stephen O. Obiya, *Leveraging Blockchain and Data Analytics to Enhance Financial Inclusion in Nigeria: A Study of Blockchain-Based Information System*, 2025 Int'l J. Res. Sci. & Innovation, 547, 547–557, https://rsisinternational.org/journals/ijrsi/articles/leveraging-blockchain-and-data-analytics-to-enhance-financial-inclusion-in-nigeria-a-study-of-blockchain-based-information-system/ (last visited May 31, 2025).

[15] Id.

[16] Dr. Munir Ahmad, Muhammad Idrees & Muhammad Saleem Qazi, "*Digital Currency Financing Terrorists in Pakistan: The Way Forward*", 1 BBE J. 177-181, https://bbejournal.com/BBE/article/view/672/582 (DOI: 10.61506/01.00176) (last visited May 31, 2025).

[17] Financial Crime Academy, "*Understanding Money Laundering with Virtual Assets*", https://financialcrimeacademy.org/blockchain-and-money-laundering/ (last visited May 31, 2025).

[18] Id.

B. Consensus Mechanisms: PoW's Environmental Toll vs. PoS's Sustainable Potential

Consensus mechanisms are central to blockchain's operation. **Proof of Work (PoW)**, as used by Bitcoin, requires miners to solve complex cryptographic puzzles, consuming vast amounts of energy. Bitcoin mining consumes between 63 and 150 terawatt-hours (TWh) annually—comparable to the electricity usage of entire nations like Poland—and emits millions of metric tons of CO_2, rivaling the carbon footprint of small countries. The environmental and health impacts of PoW mining are significant, with concerns about resource-intensive procedures, reliance on non-renewable energy, and the emission of air pollutants. In regions like India, crypto mining often relies on coal-dependent energy sources, exacerbating environmental concerns.[19]

In contrast, **Proof of Stake (PoS)** offers a sustainable alternative. Ethereum's transition to PoS in 2022 ("The Merge") reduced its energy consumption by over 99%, from 23 million MWh to just 2,600 MWh annually.[20] PoS selects validators based on their staked assets, rather than computational power, ensuring security without excessive energy expenditure.[21] The shift to PoS and the adoption of renewable energy sources can significantly reduce the carbon footprint of the crypto industry, making blockchain more sustainable and environmentally friendly.[22]

C. Cryptocurrency Case Studies: Tools for Good vs. Vectors of Risk

Ethereum is the primary platform for decentralized finance (DeFi), enabling self-executing smart contracts that power applications like decentralized exchanges (e.g., Uniswap) and **non-fungible token (NFT)** marketplaces. DeFi platforms democratize financial services, offering microloans, insurance, and savings to unbanked populations. However, the lack of robust KYC/AML safeguards has also enabled scams and illicit activity, as highlighted by recent risk assessments.[23]

Tether (USDT), a USD-pegged stablecoin, dominates the market by minimizing volatility. Its circulating supply exceeds $80 billion, but its opacity and widespread adoption have made it a tool for illicit activities, including $19.3 billion in illicit transactions in 2023, particularly terror

[19] Nathan Reiff, *"What's the Environmental Impact of Cryptocurrency?"*, Investopedia, https://www.investopedia.com/tech/whats-environmental-impact-cryptocurrency/.
[20] Casper Network, *"Proof of Stake Energy Consumption Guide"*, https://www.casper.network/get-started/proof-of-stake-energy-consumption (last visited May 31, 2025).
[21] *Amy Kalnoki, "Explained: Proof of Work vs. Proof of Stake Carbon Footprint", https://www.bitwave.io/blog/explained-proof-of-work-vs-proof-of-stake-carbon-footprint*..
[22] Shivangi ,Root quotient, *Comparing PoS and PoW for a Sustainable DeFi Environment*, https://www.rootquotient.com/blog/comparing-pos-and-pow-for-a-sustainable-defi-environment/.
[23] Komodo Platform, *Ethereum in DeFi*, https://komodoplatform.com/en/academy/ethereum-in-defi/

financing on the Tron blockchain. Regulatory bodies globally have flagged Tether's role in sanctions evasion and money laundering.[24]

Celo stands out for its first mobile design, using phone numbers as wallet addresses to bridge the digital divide in developing economies. Its stablecoin, cUSD, facilitates low-cost remittances and microloans in regions like Kenya and Colombia. Partnering with Mercy Corps Ventures, Celo enables unbanked populations to access savings and credit without smartphones, advancing financial inclusion.[25]

Ripple (XRP) focuses on institutional adoption through RippleNet, connecting over 300 financial institutions and streamlining cross-border payments from days to seconds while cutting fees by up to 60%. Despite ongoing regulatory challenges, Ripple's partnerships with central banks for CBDC development highlight its growing influence.[26]

Tezos offers on-chain governance, allowing stakeholders to vote on protocol upgrades without hard forks. This feature supports complex financial contracts and real-world asset tokenization, as demonstrated by the French military's use of Tezos for supply chain transparency.[27]

Litecoin prioritizes accessibility with 2.5-minute block times and low transaction fees, making it suitable for everyday payments. Its MimbleWimble upgrade enhances privacy, providing an alternative to traceable fiat systems.[28]

III. Cryptocurrency as Economic Empowerment

Across the developing world, cryptocurrency is increasingly seen as a tool for financial inclusion and upward mobility, especially where traditional banking systems are inaccessible or unreliable.

In Nigeria, for example, economic instability and currency devaluation have driven millions toward digital assets**. Tola Fadugbagbe's** journey is emblematic: starting with just $100–$200 in Bitcoin, he leveraged crypto trading to transform his life, amassing over $200,000, building

[24] Olga Kharif, *"Tether's USDT Is Most Used Stablecoin in Illicit Crypto Flows", TRM Says*, Bloomberg (Mar. 27, 2024, 5:00 AM), https://www.bloomberg.com/news/articles/2024-03-27/tether-usdt-is-most-used-stablecoin-in-illicit-crypto-flows-trm-says.
[25] Binance Square, "*Celo's Financial Inclusion Projects: Transforming the Market*", https://www.binance.com/en/square/post/14825183613338.
[26] Binance Square, *List of Institutions that are Using, Adopting or Exploring XRP*, https://www.binance.com/en/square/post/21549053560490.
[27] Kathleen Breitman, *Tezos (XTZ): "Superior Governance and Use Cases"*, Gemini Cryptopedia (Oct. 5, 2023), https://www.gemini.com/cryptopedia/what-is-tezos-xtz-governance-use-case.
[28] Binance Square, *Litecoin MimbleWimble Upgrade*, https://www.binance.com/en/square/post/1294524073581.

a home, and launching a farm. His story, widely reported and celebrated, has inspired a wave of adoption in Nigeria, where 32% of surveyed adults reported using cryptocurrencies—the highest rate globally. For many, crypto offers a hedge against inflation, a means to preserve wealth, and a gateway to global markets, even as regulatory crackdowns persist.[29]

Beyond individual success stories, platforms like Celo are fostering economic resilience at the community level. Celo's cUSD stablecoin is designed for mobile-first use, enabling low-cost remittances and micropayments. Its ecosystem supports decentralized applications and financial tools accessible to anyone with a smartphone, making it especially valuable in regions with limited banking infrastructure. Celo's stability mechanisms and transparent governance further promote trust and usability, supporting entrepreneurship and financial inclusion worldwide.[30]

India, too, is harnessing digital currency for inclusive growth. The government's introduction of **a Central Bank Digital Currency (CBDC)**, the Digital Rupee, is aimed at bridging the rural- urban financial divide. CBDC promises instant, low-cost, and even offline transactions, making digital payments accessible to farmers, senior citizens, and rural populations. By integrating millions of unbanked citizens into the formal economy, India's CBDC initiative seeks to boost digital adoption, streamline payments, and foster economic opportunity in underserved regions.[31]

These case studies—from Nigeria's grassroots adoption to Celo's mobile-first platform and India's state-backed digital currency—demonstrate cryptocurrency's potential to empower individuals and communities, drive entrepreneurship, and promote financial inclusion.

IV. Cryptocurrency as a Regulatory Nightmare

Yet, the same features that make cryptocurrency empowering—anonymity, decentralization, and borderless transferability—also create profound regulatory challenges, especially in countries facing security and governance issues. Pakistan's experience is instructive. While the government has oscillated between bans and attempts at regulation, cryptocurrencies have become a preferred medium for terror financing. Their anonymity and ease of cross-border transfer allow terrorist organizations to bypass traditional financial oversight. Reports document how groups such as ISIS and the Tehreek Taliban Pakistan have exploited digital

[29] Kobi, "*Cryptocurrency Adoption Soars in Nigeria: Beacon of Financial Innovation*", LinkedIn (Apr. 7, 2023), https://www.linkedin.com/pulse/cryptocurrency-adoption-soars-nigeria-beacon-financial-kobi-u5cuf/.
[30] Ndax, "*What Is Celo (CELO) and How Does It Work?*", https://ndax.io/en/blog/article/what-is-celo-celo.
[31] Press Information Bureau, "*Introduction of Central Bank Digital Currency (CBDC) – Digital Rupee*", https://www.pib.gov.in/Pressreleaseshare.aspx?PRID=1794160 .

currencies to move funds undetected, posing a serious threat to national and regional security. The opacity of crypto transactions, especially in a country already struggling with financial transparency, complicates efforts to combat money laundering and illicit flows.[32]

Tax evasion is another significant concern. Privacy coins, designed for enhanced anonymity, are increasingly used in Pakistan to conceal income and evade taxes. Studies show a strong correlation between privacy coin adoption and tax evasion motives, prompting authorities to introduce stricter regulations, withholding taxes, and compliance requirements. However, the decentralized nature of crypto and the prevalence of peer-to-peer trading continue to undermine enforcement efforts.[33]

Cybersecurity risks further compound the regulatory nightmare. The lack of centralized oversight exposes users and systems to hacking, scams, and ransomware attacks, threatening both individual investors and national financial stability.

Finally, the environmental costs of cryptocurrency, particularly Bitcoin mining, are substantial. Mining operations worldwide emitted over 85 million metric tons of CO2 in 2020–2021, with 67% of electricity sourced from fossil fuels. In countries like Pakistan, where the power grid is already under strain, energy-intensive mining could worsen blackouts and raise energy costs for households. Globally, the sector's carbon, water, and land footprints are significant, raising urgent questions about sustainability and resource allocation.[34]

V. India's Tightrope: Innovating Without Losing Control

India's cryptocurrency journey is a compelling case of balancing innovation with regulatory caution. The country's approach has been defined by dramatic policy oscillations, bold experiments like the Digital Rupee, and persistent challenges that highlight the tension between economic empowerment and regulatory control.

A. Regulatory Whiplash: From Bans to CBDC Pilots

India's regulatory landscape for cryptocurrency has been marked by sharp swings and ongoing uncertainty. The Reserve Bank of India (RBI) first issued warnings about virtual currencies in

[32] Avni Goel, "*Pakistan Has a New Obsession: Crypto Mining"*, NDTV (June 10, 2024), https://www.ndtv.com/opinion/pakistan-has-a-new-obsession-crypto-mining-8535992 (last visited May 31, 2025).
[33] *Abdul Rauf Shakoori, "Pakistan's roadmap to crypto legalization—IV: Taxation of cryptocurrency assets, Business Recorder" (Mar. 27, 2025), https://www.brecorder.com/news/40355727 (last visited May 31, 2025).*
[34] United Nations University, *UN Study Reveals Hidden Environmental Impacts of Bitcoin: Carbon Is Not the Only Harmful Product* (press release, Oct. 24, 2023), https://unu.edu/press-release/un-study-reveals-hidden-environmental-impacts-bitcoin-carbon-not-only-harmful-product.

2013, citing concerns over volatility, consumer protection, and the potential for illicit activity. This caution culminated in the RBI's 2018 circular, which effectively banned banks from providing services to crypto businesses. The move stifled the fledgling industry, forcing exchanges to shut down or move operations offshore.[35]

However, this restrictive stance was challenged in 2020, when the Supreme Court overturned the RBI ban. The Court ruled that the prohibition was disproportionate and violated the constitutional right to trade, reopening the door for crypto innovation and signaling a shift toward regulatory engagement rather than outright exclusion.

Yet, the policy pendulum swung again. In 2021, the government introduced a draft bill proposing a ban on private cryptocurrencies while paving the way for a **Central Bank Digital Currency (CBDC)**. Instead of clear legalization or prohibition, India adopted a "grey zone" approach: cryptocurrencies are neither recognized as legal tender nor explicitly banned, but are subject to heavy taxation—a **30% tax on gains and a 1% tax deducted at source (TDS)** on transactions.[36] This high-tax regime, introduced in the 2022 budget, has driven much of the trading volume offshore and left the industry in regulatory limbo.

Amid these oscillations, the government is now preparing a comprehensive discussion paper on crypto regulation, aiming to clarify its stance and address both the opportunities and risks inherent in digital assets. This ongoing flux underscores India's struggle to balance the promise of innovation with the imperative of financial stability and consumer protection.[37]

B. The Digital Rupee: Empowerment Tool or Surveillance Mechanism?

India's foray into central bank digital currency—the Digital Rupee—marks a new chapter in its digital finance ambitions. The CBDC is touted as a tool for financial inclusion, promising instant, low-cost, and even offline transactions, particularly for rural and unbanked populations. By leveraging the reach of digital payments, the Digital Rupee aims to bridge gaps in access and bring millions into the formal financial system. However, the CBDC's design introduces a new set of tensions. Unlike cash, every transaction with the Digital Rupee is traceable, raising concerns about privacy and the potential for state surveillance. While this transparency can help curb illicit finance and improve tax compliance, it also risks eroding individual privacy and

[35] KYC Hub, *Cryptocurrency Regulations in India*, https://www.kychub.com/blog/cryptocurrency-regulations-in-india.
[36] Ram Rastogi, *Economic Impact of India's Crypto Legislation on the Global Market*, LinkedIn (Apr. 10, 2024), https://www.linkedin.com/pulse/economic-impact-indias-crypto-legislation-global-ram-rastogi--ac6z.
[37] AInvest, *India to Release Crypto Regulation Paper in June*, https://www.ainvest.com/news/india-release-crypto-regulation-paper-june-250.

could lead to arbitrary restrictions on legitimate transactions. Legal experts warn that such centralized control must be balanced with constitutional protections, particularly the right to privacy and equality.[38]

The government has acknowledged these risks and is exploring privacy-enhancing features and tiered KYC requirements to mitigate them. Still, the debate continues: can the Digital Rupee truly empower citizens without compromising their autonomy, or does it risk becoming a tool for excessive oversight?[39]

C. Persistent Challenges: Coal-Powered Mining and Urban-Rural Divides

India's crypto journey is further complicated by environmental and infrastructural challenges that reinforce the empowerment-regulation tension.

Environmental Impact:

Most cryptocurrencies, especially those using proof-of-work mechanisms like Bitcoin, are **energy-intensive**. Globally, mining is heavily reliant on fossil fuels—coal alone powers a significant share of the network. In India, where the electricity grid is still **largely coal-based**, mining operations add to the country's carbon footprint and strain energy resources. This raises questions about the sustainability of widespread crypto adoption and has prompted calls for greener alternatives or stricter regulation of mining activities.[40]

Urban-Rural Digital Divide:

The promise of digital empowerment through crypto and the Digital Rupee is hindered by India's stark urban-rural digital divide. While urban areas enjoy robust internet access and digital literacy, rural regions lag, with only a fraction of households having reliable connectivity. This gap limits the reach of digital financial services, risking further exclusion of vulnerable populations if not addressed through targeted policy and infrastructure investments.[41]

Conclusion

India's cryptocurrency journey is a high-wire act—constantly negotiating between the drive for innovation and the need for control. The country's regulatory whiplash reflects deep-seated anxieties about financial stability and consumer protection, even as it seeks to harness the

[38] Legal, supra note 3.
[39] KYC Hub, *Cryptocurrency Regulations in India*, https://www.kychub.com/blog/cryptocurrency-regulations-in-india.
[40] Id.
[41] Hub, supra note 39.

transformative power of digital assets. The Digital Rupee stands as both a symbol of empowerment and a potential surveillance tool, while environmental and infrastructural challenges add further complexity to the equation. As India prepares to release a comprehensive crypto regulation framework, the challenge is clear: to innovate boldly without losing sight of privacy, sustainability, and equitable access. Only by walking this tightrope thoughtfully can India realize the full potential of digital finance.[42]

Global Lessons: Empowerment Successes vs. Regulatory Failures

The global evolution of cryptocurrency and blockchain technology offers a spectrum of lessons—spanning bold national experiments, contrasting regulatory philosophies, and innovative social impact projects. Each case underscores the ongoing tension between economic empowerment and regulatory risk.

El Salvador's Gamble: Bitcoin as Legal Tender

In 2021, El Salvador became the first country to adopt Bitcoin as legal tender, aiming to boost financial inclusion, attract investment, and lower remittance costs for its unbanked population. The government launched the Chivo wallet and offered incentives, but the rollout faced significant challenges. Technical glitches, lack of public understanding, and Bitcoin's volatility led to low adoption—polls showed that **68% of Salvadorans disagreed** with the decision, and by 2024, the vast majority still preferred using U.S. dollars for daily transactions.[43]

International organizations, including the IMF, raised concerns about fiscal stability, money laundering, and the risks of holding volatile assets as national reserves. In 2025, El Salvador's The $1.4 billion IMF bailout was conditioned on scaling back its Bitcoin ambitions, as observers declared the project a regulatory and economic failure. The lesson is clear: **empowerment through crypto requires robust infrastructure, public trust, and regulatory clarity— without which, even the boldest policies can backfire and threaten financial stability**.[44]

The U.S. and EU: Contrasting Regulatory Philosophies

While El Salvador's approach was radical and centralized, the United States and European Union have taken divergent paths in regulating cryptocurrency**.**

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[42] The New Indian Express, *Crypto Regulation Will Protect Investors and Position India as Innovation Hub, Say Exchanges* (May 21, 2025), https://www.newindianexpress.com/business/2025/May/21/crypto-regulation-will-protect-investors-and-position-india-as-innovation-hub-say-exchanges.

[43] Wikipedia, *Bitcoin in El Salvador*, https://en.wikipedia.org/wiki/Bitcoin_in_El_Salvado.

[44] Samuel Johnson-Saeger, *The IMF Is Bailing Out El Salvador—It Shouldn't Be So Lenient on Cryptocurrency*, Council on Foreign Relations (blog), https://www.cfr.org/blog/imf-bailing-out-el-salvador-it-shouldnt-be-so-lenient-cryptocurrency.

United States: Enforcement-Driven Uncertainty

The U.S. has relied heavily on enforcement actions, primarily through the Securities and Exchange Commission (SEC). The SEC has used the Howey Test and legal proceedings to define the regulatory status of digital assets, leading to a climate of uncertainty for innovators and investors. Although a new Crypto Task Force signals a move toward more comprehensive engagement, the lack of clear, unified legislation has left the industry navigating a patchwork of rules and ongoing legal risk.[45]

European Union: Proactive Harmonization

In contrast, the EU's Markets in Crypto-Assets Regulation (MiCA) establishes a harmonized legal framework for crypto-assets and service providers across all member states. MiCA offers legal certainty, robust consumer protection, and anti-money laundering standards, supporting innovation while minimizing regulatory arbitrage. The EU's approach demonstrates that **clear, harmonized regulation can empower both growth and stability, providing a model for balancing innovation with oversight**.[46]

Blockchain for Social Impact: Empowerment Amid Regulatory Tension

Beyond finance, blockchain is driving social impact and economic empowerment through transparent, direct aid and new models for community engagement—while also navigating complex regulatory landscapes.

UNICEF Crypto Fund: Transparent and Direct Aid

UNICEF's CryptoFund leverages blockchain to receive, hold, and disburse cryptocurrency donations directly to open-source projects benefiting children and young people. Every transaction is publicly recorded, ensuring transparency and reducing administrative costs. This empowers grassroots innovators and accelerates humanitarian aid. However, the initiative must address regulatory hurdles, including the volatility of crypto assets and varying compliance requirements across jurisdictions.[47]

World Food Program (WFP): Building Blocks for Refugee Empowerment the WFP's Building Blocks project uses blockchain and biometric authentication to deliver cash

[45] Akshay S. Ralhi, *Beyond Enforcement: The SEC's Shifting Playbook on Crypto Regulation*, Georgetown Law Center on Transnational Business Law (blog), May 9, 2025, https://www.law.georgetown.edu/ctbl/blog/beyond-enforcement-the-secs-shifting-playbook-on-crypto-regulation.
[46] Wikipedia, *Markets in Crypto-Assets*, https://en.wikipedia.org/wiki/Markets_in_Cr.
[47] Crypto Altruism, *Four Ways the United Nations Has Embraced Blockchain and Cryptocurrency*, https://www.cryptoaltruism.org/blog/four-ways-the-united-nations-has-embraced-blockchain-and-cryptocurrenc.

assistance to refugees, such as those in Jordan's Azraq camp. The system minimizes fraud, reduces bank fees, and gives recipients greater control over their resources—fostering economic empowerment and dignity. Yet, the program faces regulatory challenges, including privacy concerns related to biometric data and the complexities of operating in environments where many lack formal identification.[48]

Rally: Creator Economies and Community Governance

Rally enables creators to launch their own social tokens, turning fans into stakeholders and communities into micro-economies. This democratizes value creation and enables new forms of collaboration and fundraising. However, the regulatory status of social tokens remains ambiguous, with risks under securities law in both the U.S. and EU, potentially stifling innovation in the absence of clear guidelines.[49]

VI. Policy Recommendations: Harnessing Empowerment, Mitigating Risks

Cryptocurrency's global trajectory underscores the need for policies that maximize economic empowerment while minimizing systemic risks. Drawing on international experiences and emerging best practices, the following recommendations synthesize approaches that enable innovation, foster inclusion, and ensure regulatory resilience.

A. Regulatory Sandboxes: Experimenting Safely

Regulatory sandboxes are controlled environments where fintech and blockchain startups can test new products under regulatory supervision. This approach allows policymakers to observe real-world impacts, adapt rules, and encourage responsible innovation without exposing the broader financial system to undue risk.

- **India's Example:** The Reserve Bank of India (RBI) has piloted sandboxes for blockchain-based remittance, payments, and microfinance solutions. These initiatives have enabled innovations such as blockchain-backed microloans for farmers, tested under close regulatory scrutiny to ensure consumer protection and compliance.[50]
- **Global Perspective:** The UK's Financial Conduct Authority (FCA) has published anonymized findings from its sandbox, helping guide broader policy and industry standards.

Recommendations:

[48] Luise Perlitt, Making Sense of Blockchain Technology in the Humanitarian Sector: A Case Study Analysis of 'Building Blocks', 17 iSCHANNEL 12, 12–19 (2022), https://ischannel.lse.ac.uk/articles/209.
[49] Wikipedia, supra note 46.
[50] Christopher Fabian, *UN-chained: Experiments and Learnings in Crypto at UNICEF*, 12 Innovations: Technology, Governance, Globalization 30, 30–45 (2018), https://direct.mit.edu/itgg/article-pdf/12/1-2/30/705253/inov_a_00265.pdf

- Expand cross-border sandboxes to facilitate multinational crypto remittance pilots, especially for migrant corridors.
- Prioritize sandbox participation for projects targeting rural inclusion, disaster relief, and financial literacy.
- Require public reporting of sandbox outcomes to inform adaptive regulation.

Financial Literacy and Infrastructure: Bridging the Digital Divide

Empowerment through digital assets is only possible when populations have the knowledge and infrastructure to participate safely.

- **Grassroots Education:** In Nigeria, organizations like Blockchain Nigeria User Group (BNUG) have partnered with local governments to deliver workshops on wallet safety and scam prevention, tailored to local languages and contexts.[51]
- **School Integration:** Countries such as the Philippines have proposed integrating blockchain basics into school curricula to foster early digital literacy.
- **Inclusive Infrastructure:** India's Digital Rupee pilot includes offline and feature phone-compatible solutions, ensuring access for those without smartphones or stable internet.[52]

Recommendations:

- Dedicate a portion of crypto transaction taxes to fund public literacy campaigns.
- Mandate interoperability between central bank digital currencies (CBDCs) and private wallets to prevent exclusion.
- Partner with telecom providers to subsidize data costs for low-income users.

Global Collaboration: Adopting FSB Standards

Given the borderless nature of cryptocurrencies, international cooperation is essential. The Financial Stability Board (FSB) and International Monetary Fund (IMF) have developed frameworks to harmonize standards while allowing for local adaptation.

- **Stablecoin Regulation:** The FSB recommends 1:1 liquidity backing for stablecoins to prevent collapses like Terra-Luna and calls for uniform anti-money laundering (AML) standards across areas.[53]

[51] Crypto Altruism, Four Ways the United Nations Has Embraced Blockchain and Cryptocurrency**,** https://www.cryptoaltruism.org/blog/four-ways-the-united-nations-has-embraced-blockchain-and-cryptocurrency.
[52] Id.
[53] https://cointelegraph.com/news/imf-el-salvador-efforts-stop-bitcoin-buys-120m-payments-deal.

- **Cross-Border Taxation:** The OECD's Crypto Asset Reporting Framework (CARF) enables real-time tax data sharing using blockchain analytics, improving compliance and reducing evasion.
- **Cybersecurity and Sustainability:** The EU's Markets in Crypto-Assets Regulation (MiCA) include provisions for environmental sustainability and consumer protection, while the IMF has tied crypto regulatory compliance to financial aid, as seen in El Salvador's recent loan agreement.[54]

Recommendations:

- Adopt FSB and IMF guidelines on stablecoin reserves and AML compliance.
- Implement automated tax reporting systems for crypto assets to facilitate cross-border enforcement.
- Incentivize green mining practices and support the development of global cybersecurity alliances.

The question of whether cryptocurrency is a force for economic empowerment or a regulatory nightmare is not a matter of choosing one side over the other but rather recognizing that its true impact depends on the quality of governance and policy design. **Global experiences** reveal that **cryptocurrency can be a powerful tool for financial inclusion and innovation**—as seen in Nigeria's grassroots adoption and India's push for a digital rupee—when supported by robust infrastructure, education, and regulatory clarity. Conversely, poorly executed experiments, such as El Salvador's rushed Bitcoin rollout, and unchecked risks around privacy, security, and environmental impact, highlight the dangers of inadequate oversight. Even in decentralized systems, the need for transparent, inclusive governance remains paramount. For India, the path forward lies in embracing digital innovation with strong guardrails: designing the CBDC to prioritize inclusion and privacy, incentivizing sustainable blockchain practices, investing in financial literacy, and aligning with global standards through international collaboration.

Cryptocurrency's future—both in India and worldwide—will be shaped not by the technology itself, but by the wisdom, adaptability, and inclusiveness of the legal and regulatory frameworks that govern it. The challenge and opportunity for policymakers is to move beyond the binary of empowerment versus nightmare and instead craft a balanced approach that unlocks the transformative potential of cryptocurrency while safeguarding the public interest.

[54]Global Government Fintech, *EU Crypto Regulation MiCA Comes Fully into Force*, https://www.globalgovernmentfintech.com/eu-crypto-regulation-mica-fully-into-force/.