

Legal Analysis of Bitcoin Ownership as a Medium of Exchange in the Digital Financial System

Gesa Bimantara^{1*}, Tri Astuti Handayani², M. Aqiel Alami³

¹ Universitas Bojonegoro, Indonesia. E-mail: gesabimantara1@gmail.com

² Universitas Bojonegoro, Indonesia. E-mail: nanin.trias@gmail.com

³ Universitas Bojonegoro, Indonesia. E-mail: Bojonegorohits1@gmail.com

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Abstract: This study examines the legal status and implications of Bitcoin ownership as a medium of exchange within Indonesia's evolving digital financial system. In light of persistent regulatory ambiguity, the research seeks to understand how legal uncertainty shapes the use and recognition of Bitcoin as a transactional asset. Employing a qualitative socio-legal approach, the study integrates doctrinal legal analysis with empirical findings obtained from in-depth interviews with cryptocurrency users, legal scholars, and financial regulators. The findings reveal that Bitcoin ownership in Indonesia lacks formal legal recognition, as there is no existing state-sanctioned registration system or institutional mechanism to validate cryptographic ownership. Instead, the private key remains the only accepted evidence of control and possession, creating a decentralized system of ownership that operates independently from conventional legal doctrines. Despite regulatory restrictions, Bitcoin continues to be used in informal peer-to-peer transactions, primarily driven by user preferences for privacy, decentralization, and efficiency. This disconnect between legal structures and technological realities generates vulnerabilities for users, particularly in cases involving fraud, inheritance, taxation, or contractual disputes, where no formal recourse exists. The research concludes that Indonesia's legal framework remains ill-equipped to handle the complexities of decentralized financial assets, posing challenges to legal enforceability and consumer protection. The study recommends the establishment of a voluntary, state-recognized digital asset registration system, along with capacity-building initiatives for regulators. These measures aim to enhance legal certainty, bridge institutional gaps, and support the integration of blockchain-based assets into Indonesia's formal financial and legal ecosystem.

Keywords: Bitcoin, Blockchain, Digital Finance, Crypto, Legal Ownership

1. Introduction

The rapid development of digital technology has brought significant changes in various aspects of human life, including the economic sector and financial transactions.¹ This transformation is marked by the emergence of various digital instruments that offer new ways of conducting transactions, one of which is digital assets like Bitcoin. Bitcoin is a decentralized virtual currency introduced by an anonymous figure known as Satoshi Nakamoto in 2009,² which enables peer-to-peer transactions without the involvement of financial institutions as intermediaries. Unlike conventional currencies controlled by central banks, Bitcoin operates through a decentralized network using cryptographic verification, allowing users to transfer value across borders quickly, efficiently, and relatively anonymously. However, despite its technological advantages and utility, Bitcoin's presence also presents complex legal challenges, especially in countries whose regulatory systems have not yet fully accommodated virtual currencies. In Indonesia, for instance, Law Number 7 of 2011 concerning Currency explicitly states that the only legal tender is the Indonesian Rupiah. In addition, Bank Indonesia Regulation Number 23/6/PBI/2021 classifies Bitcoin and similar instruments such as BlackCoin, Litecoin, and Peercoin as virtual currencies that are

¹ Ajay Kumar et al., "Securing Logistics System and Supply Chain Using Blockchain," *Applied Stochastic Models in Business and Industry* 37, no. 3 (May 11, 2021): 413–28, <https://doi.org/10.1002/asmb.2592>.

² Samuele Bibi, "Money in the Time of Crypto," *Research in International Business and Finance* 65 (April 2023): 101964, <https://doi.org/10.1016/j.ribaf.2023.101964>.

not recognized as legal means of payment in Indonesia. Thus, normatively, the legal existence of Bitcoin in Indonesia lacks a strong foundation, and its use does not fall under the formal legal protection of the state.³

Although Bitcoin is not legally recognized as a valid means of payment in Indonesia, in practice, the phenomenon of cryptocurrency usage continues to grow and even shows an increasing trend, especially among young people and digital economy players. This phenomenon can be seen as a societal response to the globalization of the digital economy, where national boundaries are becoming increasingly blurred in online trade and cross-border investment activities. The use of Bitcoin in this context is not only viewed as a form of innovation in financial transactions but also as a symbol of resistance to the conventional financial system, which is often perceived as slow, bureaucratic, and lacking transparency. Many micro-entrepreneurs and individual investors use Bitcoin as an alternative instrument for hedging, asset diversification,⁴ and even speculation. On the other hand, the absence of legal protection for Bitcoin users in Indonesia creates significant vulnerabilities, such as exposure to fraud, extreme price volatility, and potential violations of laws related to money laundering and terrorist financing. In this context, the emerging social phenomenon reveals a tension between the rapid pace of global digital technological development and the national regulatory structure that has not kept up. This results in a dilemma between the push for digital innovation based on decentralization and the need for legal certainty and consumer protection. This phenomenon reflects a transformation of values in Indonesian digital society, where trust in traditional financial systems is gradually being replaced by blockchain-based technologies that promise greater transparency, speed, and personal control over assets.

The rapid growth of digital technology has brought profound changes to the global financial system, particularly through the emergence of blockchain-based digital assets such as Bitcoin.⁵ As a decentralized currency that allows peer-to-peer transactions without intermediaries, Bitcoin represents a shift from traditional centralized monetary systems toward an open,⁶ distributed financial infrastructure. Its increasing use across the globe has sparked debates regarding its legal classification, enforcement, and regulatory treatment, especially in jurisdictions where digital currency is not explicitly recognized by law. In Indonesia, this issue is particularly complex due to the legal framework that exclusively recognizes the Rupiah as the only legal tender, thereby excluding Bitcoin from the category of legitimate payment instruments. Despite this, Bitcoin continues to be actively traded, used, and invested in by a growing number of Indonesians, revealing a disconnect between regulatory structures and technological realities. The current legal stance categorizes Bitcoin as a digital commodity that may be traded in the futures market but not used as currency, creating ambiguity and inconsistency in legal interpretation and enforcement.⁷ This uncertainty affects not only legal clarity for consumers and businesses but also challenges broader legal principles such as transparency, protection of rights, and legal predictability in digital economic activities. Without clear legal recognition, Bitcoin users operate in a grey zone that is vulnerable to legal risk, fraud, and lack of recourse. Moreover, the legal system's inability to adequately respond to the rapid evolution of financial technologies exposes structural rigidity and institutional inertia, highlighting the urgent need for regulatory innovation that aligns with the dynamics of digital transformation while preserving legal integrity and public trust in the financial system.

The purpose of this study is to examine and analyze the legal implications of the uncertain status of Bitcoin in Indonesia, with particular focus on two interrelated issues: first, how the concept of ownership can be legally applied to an intangible, decentralized asset like Bitcoin; and second, whether and to what

³ Raden Muhammad Arvy Ilyasa, "Legalitas Bitcoin Dalam Transaksi Bisnis Di Indonesia," *Lex Scientia Law Review* 3, no. 2 (November 22, 2019): 115–28, <https://doi.org/10.15294/lesrev.v3i2.35394>.

⁴ Bibi, "Money in the Time of Crypto."

⁵ Angela S.M. Irwin and Caitlin Dawson, "Following the Cyber Money Trail," *Journal of Money Laundering Control* 22, no. 1 (January 7, 2019): 110–31, <https://doi.org/10.1108/JMLC-08-2017-0041>.

⁶ Tomás N. Rotta and Edemilson Paraná, "Bitcoin as a Digital Commodity," *New Political Economy* 27, no. 6 (November 2, 2022): 1046–61, <https://doi.org/10.1080/13563467.2022.2054966>.

⁷ Farouq Ahmad Faleh Alazzam et al., "The Nature of Electronic Contracts Using Blockchain Technology – Currency Bitcoin as an Example," *Revista de Gestão Social e Ambiental* 17, no. 5 (July 4, 2023): e03330, <https://doi.org/10.24857/rgsa.v17n5-014>.

extent Bitcoin can be integrated into the national legal system as a legitimate instrument for electronic transactions. This research seeks to fill the existing regulatory gap by offering a normative analysis that supports the development of an adaptive legal framework capable of embracing technological innovation without undermining national monetary sovereignty or public legal protection. The findings are expected to contribute to national policy development by providing clear legal reasoning and structured recommendations for regulating digital assets in a way that promotes financial inclusion, reduces legal ambiguity, and strengthens consumer safeguards. More broadly, the implications of this research extend to the international level, particularly for other developing countries facing similar challenges in reconciling digital currency practices with existing legal norms. This research provides comparative insight into how emerging economies might craft legal responses that balance the demand for innovation with the need for legal certainty, stability, and public accountability. Furthermore, it supports ongoing global discourse on the standardization of digital asset regulation and highlights the importance of international cooperation in addressing cross-border issues such as jurisdiction, taxation, cybersecurity, and illicit use. As the digital economy transcends national boundaries, this study underscores the need for legal systems to evolve in tandem with technological progress in order to ensure that law remains relevant, effective, and just in the face of transformative economic change.

2. Method

This study adopts an empirical legal research design to analyze the dynamics of Bitcoin ownership as a medium of exchange within Indonesia's evolving digital financial system. The research aims to understand how legal norms surrounding Bitcoin operate in real-world contexts, particularly in light of regulatory ambiguity and the disconnect between legal doctrine and technological practice. Unlike purely doctrinal approaches that focus solely on statutory texts, this study combines doctrinal legal analysis with empirical investigation to explore the lived experiences of stakeholders—such as regulators, legal practitioners, fintech experts, and cryptocurrency users—who engage with Bitcoin amid legal uncertainty. Employing a qualitative case study approach, the research provides an in-depth examination of how cryptocurrency laws are implemented in practice, how digital asset ownership is defined and contested, and how Bitcoin is perceived as both a transactional instrument and a store of value. The object of analysis centers on three interrelated aspects: (1) Bitcoin as a decentralized digital currency enabled by blockchain technology; (2) the legal conception of ownership, which in the case of Bitcoin is determined solely through control of cryptographic private keys; and (3) the perceived legal status of Bitcoin in Indonesia's financial and regulatory systems. The study population consists of stakeholders directly or indirectly involved in the usage, regulation, or legal assessment of Bitcoin in Indonesia. Informants were selected using purposive sampling, involving representatives from institutions such as Bank Indonesia and BAPPEBTI, legal scholars specializing in financial technology, fintech industry actors, and experienced cryptocurrency users. The sampling criteria focused on relevance, expertise, and active engagement in the practice or regulation of digital currencies to ensure a balanced and representative perspective.

Data collection methods included semi-structured interviews, document analysis, and limited field observation. Interviews were conducted both online and in-person, depending on informant availability, and followed a flexible interview guide to allow for the emergence of new themes and insights during conversations. Document analysis involved reviewing national legal instruments, including laws, government regulations, and Bank Indonesia circulars, as well as public statements, policy papers, and scholarly articles related to cryptocurrency regulation. In addition, the study examined relevant international legal frameworks and guidelines to provide comparative insights into global approaches to Bitcoin governance. Field observations were carried out in academic seminars, fintech conferences, and public forums focusing on blockchain and digital finance, allowing the researcher to capture informal interpretations of law and discourse among practitioners and experts. The data were analyzed using qualitative thematic analysis, focusing on identifying legal contradictions, implementation challenges, and conceptual gaps between regulatory texts and real-world practice. The analytical process followed three

stages: a descriptive phase mapping out the legal landscape and stakeholder perceptions of Bitcoin; a diagnostic phase identifying areas of legal ambiguity and enforcement tension; and a prescriptive phase offering regulatory recommendations to enhance legal certainty and institutional coherence. This methodology enables the research to bridge theoretical legal analysis with practical realities, providing a nuanced understanding of how emerging technologies such as Bitcoin challenge and reshape the foundations of property law and financial regulation in the digital era.

3. Result and Discussion

3.1. Regulatory Dynamics and Bitcoin Ownership in Indonesia

The private key functions as cryptographic proof of access and control,⁸ and within user communities,⁹ it is regarded as the sole legitimate marker of ownership.¹⁰ Unlike physical assets or conventional financial instruments,¹¹ which can be documented through official titles or state registries,¹² Bitcoin ownership exists entirely in the realm of code and is not supported by any national recording mechanism. This creates a gap between legal doctrine and technological reality: while the Indonesian Civil Code continues to rely on physical evidence and administrative registration to recognize property rights, Bitcoin transactions and ownership are validated solely through one's ability to sign a transaction with a private key. This dominance of technological practice over legal formalism has resulted in a parallel system of ownership in which users and service providers recognize legitimacy based on cryptographic control rather than legal acknowledgment. Such a condition not only challenges the traditional concept of property law but also exposes users to significant legal vulnerability, particularly when disputes or conflicts of ownership arise.

Regulators—often view Bitcoin as a speculative instrument or digital commodity,¹³ while others—particularly users and industry actors—perceive it as a medium of exchange or informal transactional tool, especially in cross-border activities or freelance work.¹⁴ This difference in perception is not merely semantic, but has far-reaching implications for policy enforcement and legal clarity.¹⁵ The lack of uniform classification or legal designation has created a fragmented environment in which each actor constructs their own interpretation and operational framework for Bitcoin.¹⁶ Some companies implement internal compliance procedures as if Bitcoin were a financial asset, while others treat it as a currency without official approval.¹⁷ This variation in interpretation illustrates the deep disconnect between regulatory theory and economic practice, and highlights the urgent need for legal definitional clarity. Without a unified legal framework and inter-agency coordination, this legal vacuum around Bitcoin ownership will only perpetuate confusion and weaken the enforcement of rights and obligations.

Retail users admitted they did not know which government body to contact if they experienced asset loss due to fraud, hacking, or platform failure. Unlike users of conventional financial products, Bitcoin holders

⁸ William J. Luther, "Getting Off the Ground: The Case of Bitcoin," *Journal of Institutional Economics* 15, no. 2 (April 3, 2019): 189–205, <https://doi.org/10.1017/S1744137418000243>.

⁹ Jeffrey G. Coghill, "Blockchain and Its Implications for Libraries," *Journal of Electronic Resources in Medical Libraries* 15, no. 2 (April 3, 2018): 66–70, <https://doi.org/10.1080/15424065.2018.1483218>.

¹⁰ Stearns Broadhead, "The Contemporary Cybercrime Ecosystem: A Multi-Disciplinary Overview of the State of Affairs and Developments," *Computer Law & Security Review* 34, no. 6 (December 2018): 1180–96, <https://doi.org/10.1016/j.clsr.2018.08.005>.

¹¹ Fernando Alvarez, David Argente, and Diana Van Patten, "Are Cryptocurrencies Currencies? Bitcoin as Legal Tender in El Salvador," *Science* 382, no. 6677 (December 22, 2023), <https://doi.org/10.1126/science.add2844>.

¹² Yuen C. Lo and Francesca Medda, "Assets on the Blockchain: An Empirical Study of Tokenomics," *Information Economics and Policy* 53 (December 2020): 100881, <https://doi.org/10.1016/j.infoecopol.2020.100881>.

¹³ Chris Reed et al., "Beyond Bitcoin—Legal Impurities and Off-Chain Assets," *International Journal of Law and Information Technology* 26, no. 2 (June 1, 2018): 160–82, <https://doi.org/10.1093/ijlit/eay006>.

¹⁴ Di Wu et al., "Equilibrium Analysis of Bitcoin Block Withholding Attack: A Generalized Model," *Reliability Engineering & System Safety* 185 (May 2019): 318–28, <https://doi.org/10.1016/j.res.2018.12.026>.

¹⁵ Syed Ali Raza, Maiyra Ahmed, and Chaker Aloui, "On the Asymmetrical Connectedness Between Cryptocurrencies and Foreign Exchange Markets: Evidence From the Nonparametric Quantile-on-Quantile Approach," *Research in International Business and Finance* 61 (October 2022): 101627, <https://doi.org/10.1016/j.ribaf.2022.101627>.

¹⁶ Desiree Daniel and Chinwe Ifejika Speranza, "The Role of Blockchain in Documenting Land Users' Rights: The Canonical Case of Farmers in the Vernacular Land Market," *Frontiers in Blockchain* 3 (May 12, 2020), <https://doi.org/10.3389/fbloc.2020.00019>.

¹⁷ Yue Zhou et al., "Application of Distributed Ledger Technology in Distribution Networks," *Proceedings of the IEEE* 110, no. 12 (December 2022): 1963–75, <https://doi.org/10.1109/JPROC.2022.3181528>.

are not protected by insurance mechanisms, institutional guarantees, or consumer dispute resolution forums. Moreover, because Bitcoin transactions are pseudonymous and conducted without centralized intermediaries, asset tracing and identifying responsible parties becomes extremely difficult. In the absence of a legal recognition mechanism or dispute resolution path, users often rely on informal networks, online forums, or foreign intermediaries, none of which offer legally binding protections. This lack of legal protection results in a system where users bear the entire risk, reinforcing the perception that Bitcoin operates outside the bounds of law. These findings indicate that developing an inclusive, user-oriented legal infrastructure is crucial—not only to ensure justice in cases of loss or fraud, but also to build trust in the broader digital asset ecosystem.

Regulators often frame their concerns within the context of macroeconomic stability,¹⁸ financial crime prevention,¹⁹ and currency sovereignty,²⁰ while users focus more on functionality,²¹ decentralization, and return on investment.²² This gap in priorities has led to miscommunication and public skepticism regarding regulatory intent.²³ Data show that many users interpret regulatory statements as vague warnings rather than firm prohibitions, resulting in inconsistent compliance behavior. On the other hand, some regulators admit to having limited technical knowledge about how blockchain operates or how crypto assets are structured, which affects the quality and effectiveness of their interventions. This mutual disconnect exacerbates a fragmented policy environment where digital legal literacy is low and regulatory legitimacy is questioned. The findings point to the urgent need for capacity-building initiatives on both sides: the public must be empowered with digital legal literacy, while regulators must enhance their technical expertise to issue credible, targeted, and enforceable guidance.

There is no domestic institution or certified authority capable of recording or verifying Bitcoin ownership in Indonesia. Unlike land, vehicles, or corporate shares, which require formal registration with the state or a notarial body, Bitcoin ownership relies entirely on control of cryptographic credentials. As a result, users depend on private-sector solutions—mostly foreign-based—to store and manage their assets. This includes digital wallets, crypto exchanges, and custodial services, the majority of which operate beyond Indonesian jurisdiction. The absence of formal ownership registration also complicates inheritance, taxation, and the enforcement of contracts involving Bitcoin. In the event of the owner's death or incapacitation, no legal procedure exists to transfer Bitcoin to heirs unless the private key has been shared in advance. Additionally, without a recognized registration authority, users cannot use Bitcoin as collateral or declare it as part of their legal estate. These systemic gaps not only undermine user security but also restrict the institutional integration of crypto assets into the national legal economy. The research suggests that establishing a voluntary, state-accredited system for recognizing Bitcoin ownership—akin to a digital notary—could serve as a transitional mechanism for improving legal certainty while respecting decentralization principles.

Ambiguous and often contradictory legal interpretations,²⁴ crypto entrepreneurs in Indonesia have adopted a range of strategies to mitigate legal risks. Some choose a conservative approach by storing assets in foreign jurisdictions, registering businesses overseas, or using VPNs to access international platforms. These actors often cite concerns about retroactive enforcement, unclear licensing obligations, and reputational risks in the domestic market. Others, however, continue to operate domestically, driven

¹⁸ Andrew J. Ehrenberg and John Leslie King, "Blockchain in Context," *Information Systems Frontiers* 22, no. 1 (February 22, 2020): 29–35, <https://doi.org/10.1007/s10796-019-09946-6>.

¹⁹ Nir Kshetri, "Bitcoin's Adoption as Legal Tender: A Tale of Two Developing Countries," *IT Professional* 24, no. 5 (September 1, 2022): 12–15, <https://doi.org/10.1109/MITP.2022.3205528>.

²⁰ Aiman Hairudin et al., "Cryptocurrencies: A Survey on Acceptance, Governance, and Market Dynamics," *International Journal of Finance & Economics* 27, no. 4 (October 14, 2022): 4633–59, <https://doi.org/10.1002/ijfe.2392>.

²¹ Pietro Ortolani, "Self-Enforcing Online Dispute Resolution: Lessons from Bitcoin," *Oxford Journal of Legal Studies* 36, no. 3 (September 2016): 595–629, <https://doi.org/10.1093/ojls/gqv036>.

²² Hossein Nabilou, "Testing the Waters of the Rubicon: The European Central Bank and Central Bank Digital Currencies," *Journal of Banking Regulation* 21, no. 4 (December 20, 2020): 299–314, <https://doi.org/10.1057/s41261-019-00112-1>.

²³ Rahime Belen-Saglam et al., "A Systematic Literature Review of the Tension Between the GDPR and Public Blockchain Systems," *Blockchain: Research and Applications* 4, no. 2 (June 2023): 100129, <https://doi.org/10.1016/j.bcr.2023.100129>.

²⁴ Arto Kovanen, "Competing With Bitcoin - Some Policy Considerations for Issuing Digitalized Legal Tenders," *International Journal of Financial Research* 10, no. 4 (May 6, 2019): 1, <https://doi.org/10.5430/ijfr.v10n4p1>.

by practical necessity, market demand, and confidence in informal legal norms. These entrepreneurs tend to rely on personal networks, informal contracts, and flexible operational models that adapt to shifting regulatory narratives.²⁵ This divergence in strategy reflects the broader legal uncertainty surrounding Bitcoin and the lack of consistent state enforcement. It also highlights the emergence of an informal rule-of-law ecosystem, in which legitimacy is negotiated through operational behavior rather than legal compliance. The study emphasizes the importance of a clear and forward-looking regulatory framework—one that not only defines Bitcoin's legal status but also provides realistic compliance pathways for entrepreneurs. Without such a framework, the crypto economy will continue to evolve in fragmented, uncertain, and risk-laden directions, ultimately undermining both innovation and legal accountability.

3.2. Bitcoin Usage Practices in Digital Transactions

The actual use of Bitcoin as a means of payment in Indonesia remains marginal and is limited to informal peer-to-peer (P2P) transactions,²⁶ particularly among small digital communities and individuals with high levels of technological literacy.²⁷ Such transactions typically take place in the context of mutual agreements between parties, such as in freelance digital services, niche e-commerce platforms, or community-based barter systems. It is important to note that these activities are often conducted without involving official institutions and are deliberately concealed from regulatory oversight. The use of Bitcoin as a medium of exchange is driven more by practical convenience and ideological preferences (e.g., privacy, decentralization) rather than by legal certainty or economic necessity. Empirical data indicate that, despite the explicit prohibition by Bank Indonesia, some users continue to utilize Bitcoin in closed transactions, highlighting a gap between the regulatory framework and actual user behavior on the ground. Nevertheless, the limited scale and informal nature of these transactions demonstrate that Bitcoin continues to be marginalized as a formal economic instrument in Indonesia, ultimately reflecting a chilling effect of the regulatory system on the mainstream adoption of this technology.

Interviews with crypto business actors and users reveal that many actors actively attempt to evade legal restrictions by disguising Bitcoin transactions under different legal categories. One commonly used tactic is to frame Bitcoin exchanges as bartering or as compensation for services, thereby avoiding explicit classification as payment activity, which is prohibited under Indonesian currency law. This strategy exploits legal loopholes and semantic ambiguities within existing regulations, particularly in digital service environments where verification is difficult. For example, some freelancers accept Bitcoin as a "token of appreciation" or a "donation" rather than as contractual payment, thereby escaping enforcement under monetary transaction laws. Similarly, some online business operators receive payments in Bitcoin but record them as goods exchanges in their bookkeeping. These patterns of avoidance reflect a growing sophistication among crypto actors in managing legal risks while continuing to operate. However, they also underscore the weaknesses of the current regulatory regime, which lacks the necessary precision and enforcement mechanisms to address such evasive practices. These findings emphasize the urgency of reforming financial regulations to reflect the ever-evolving nature of digital transactions, particularly within a borderless and programmable monetary environment.

Indonesian users and crypto businesses are highly dependent on foreign cryptocurrency platforms such as Binance, Coinbase, and Kraken.²⁸ This dependence is primarily driven by the absence of strong domestic infrastructure and the perception that local platforms are under strict supervision and offer limited services. Respondents often stated that international platforms provide more advanced features, greater liquidity, better security, and a broader selection of digital assets compared to their Indonesian

²⁵ Gorizky and Supardi, "Blockchain as Electronic Evidence Against Crypto Crimes in Indonesia," *Media Iuris* 7, no. 3 (October 18, 2024): 545–62, <https://doi.org/10.20473/mi.v7i3.56116>.

²⁶ Griffin Msefula, Tony Chieh-Tse Hou, and Tina Lemesi, "Financial and Market Risks of Bitcoin Adoption as Legal Tender: Evidence from El Salvador," *Humanities and Social Sciences Communications* 11, no. 1 (October 22, 2024): 1396, <https://doi.org/10.1057/s41599-024-03908-3>.

²⁷ M. Pasha Nur Fauzan and Muhammad Yoppy A, "The Extra-Legal Property Rights Design of Bitcoin and Its Philosophical Issues," *Journal of Central Banking Law and Institutions* 1, no. 3 (September 30, 2022): 455–80, <https://doi.org/10.21098/jcli.v1i3.31>.

²⁸ Faisal Yusuf et al., "Stakeholders' Perceptions of the Peer-to-Peer Energy Trading Model Using Blockchain Technology in Indonesia," *Energies* 17, no. 19 (October 3, 2024): 4956, <https://doi.org/10.3390/en17194956>.

counterparts.²⁹ Moreover, many users believe that foreign platforms offer higher levels of privacy and lower risks of government intervention. However, this cross-border dependence has serious legal implications. By using foreign platforms, Indonesian users operate outside the jurisdiction of national law, which complicates dispute resolution, consumer protection, and regulatory oversight. It also leads to capital outflows and diminishes the state's capacity to monitor and tax digital financial activities. This research reveals a systemic tension between users' preference for functional platforms and the state's aim to maintain financial sovereignty and legal accountability. This underscores the importance of developing competitive, secure, and legally integrated domestic platforms in order to reduce reliance on foreign services.

There is a complete absence of formal dispute resolution mechanisms for cases involving failed Bitcoin transactions, lost private keys, or user-to-user fraud. Unlike traditional financial services, which are backed by consumer protection laws and institutional mediation bodies, Bitcoin transactions lack formal intermediaries or contractual enforcement systems. Most users operate through decentralized platforms or informal P2P arrangements, where anonymity and immutability are viewed as both benefits and risks. When problems occur—such as unauthorized access, technical errors, or payment failures—users have no recourse to national courts or financial dispute resolution bodies, as these institutions have yet to establish procedures for handling blockchain-based evidence or contracts. As a result, users are forced to rely on informal negotiations, third-party arbitration, or international customer service channels, which are often ineffective and legally non-binding. This situation seriously undermines the rule of law in digital asset markets and disproportionately affects individual users with limited technical knowledge or access to legal support. The findings point to the urgent need for Indonesia to develop legal frameworks and technical infrastructure capable of adjudicating digital disputes in a fair and efficient manner.

International transactions involving Bitcoin pose significant legal and operational challenges due to regulatory differences between countries. Although Bitcoin is legal and regulated in some jurisdictions, it remains banned or unrecognized in others, creating complex compliance risks and transaction uncertainties. Cross-border payments using Bitcoin—particularly in freelance work, donations, or online services—frequently encounter obstacles when recipients or intermediaries are located in jurisdictions with incompatible regulations. Furthermore, the pseudonymous nature of Bitcoin complicates fund tracing, triggering concerns within financial crime monitoring systems, especially under anti-money laundering (AML) frameworks. Users have reported delays, asset freezes, or account suspensions on platforms operating in countries with stricter financial regulations. In addition, there is no mechanism for transaction reversal, and cross-border legal enforcement is nearly impossible without international agreements on crypto-related dispute resolution. These findings highlight the structural limitations of using decentralized financial instruments in a fragmented global legal environment. For Indonesia, this suggests the importance of actively engaging in international regulatory dialogues and treaties related to crypto transactions to ensure cross-border legal coherence and protect its citizens from transnational financial vulnerabilities.

There is a marked adaptability among crypto users and entrepreneurs in responding to an ever-changing policy environment.³⁰ In reaction to ambiguous or restrictive legal announcements, many actors adjust their transaction patterns, migrate across platforms, or anonymize their digital identities in order to continue operating while minimizing legal exposure. Some users transfer their assets to decentralized exchanges (DEXs) or privacy-oriented wallets, while others register their businesses in offshore jurisdictions or use intermediaries to obscure the flow of funds. This adaptive behavior reflects a high level of legal awareness and risk management, particularly among those with significant investments in crypto markets. However, such strategies also illustrate the ineffectiveness of current enforcement

²⁹ Istianah Zainal Asyiqin, M. Fabian Akbar, and Manuel Beltrán Genovés, "Cryptocurrency as a Medium of Rupiah Exchange: Perspective Sharia Islamic Law and Jurisprudential Analysis," *Volksgeist: Jurnal Ilmu Hukum Dan Konstitusi*, November 22, 2024, 227–92, <https://doi.org/10.24090/volksgeist.v7i2.10975>.

³⁰ Intan Dwi Astuti, Suryazi Rajab, and Desky Setiyoudi, "Cryptocurrency Blockchain Technology in the Digital Revolution Era," *Aptisi Transactions on Technopreneurship (ATT)* 4, no. 1 (January 5, 2022): 9–16, <https://doi.org/10.34306/att.v4i1.216>.

approaches, which tend to be reactive and lack technological sophistication. Empirical evidence shows that as long as the regulatory environment remains uncertain and punitive, actors will continue to innovate covertly, using advanced tools to obscure their operations. This reinforces the necessity for Indonesia to move from a compliance-based regulatory approach to a more adaptive and dialogic model—one that balances innovation incentives with clear, enforceable rules and inclusive stakeholder engagement.

3.3. Socio-Legal Implications of Legal Uncertainty on Bitcoin Ownership and Transactions

The lack of comprehensive and enforceable regulations regarding Bitcoin and other cryptocurrencies in Indonesia has inadvertently created a legal grey area that fosters informal innovation and unregulated activity. In this vacuum,³¹ market actors—including developers, traders, and users—have found ways to operate without clear legal boundaries,³² often bypassing traditional oversight mechanisms.³³ The empirical findings suggest that the legal uncertainty surrounding Bitcoin ownership and transactions has not deterred its use; instead,³⁴ it has led to the growth of underground economies, peer-to-peer trading platforms,³⁵ and informal custodial arrangements. These practices, while innovative, also raise serious concerns about transparency, accountability, and consumer protection. Without legal obligations or clear licensing procedures, these actors operate outside the scope of national law, making enforcement of rights and dispute resolution virtually impossible. The informal growth of this sector signals that the absence of regulation does not equate to the absence of activity; on the contrary, it fuels decentralized innovation that is disconnected from the formal legal and financial systems. This state of regulatory limbo presents both an opportunity and a challenge: while it allows room for experimentation, it also exposes users to significant legal and financial risks, highlighting the urgent need for state intervention to formalize and guide the growth of the crypto ecosystem within a robust legal framework.

The interaction between Bitcoin users and regulators in Indonesia has not been confrontational but rather characterized by a silent negotiation,³⁶ where both parties attempt to balance interests within the constraints of current legal structures.³⁷ On one hand, users—aware of the ambiguous status of cryptocurrencies—often limit the scope of their engagement to speculative investment or offshore platforms, thus minimizing exposure to potential legal sanctions. On the other hand, regulators such as Bank Indonesia and BAPPEBTI exhibit caution, neither fully embracing nor outright banning all forms of crypto-related activity, creating what can be described as a passive permissive space. Interviews with digital entrepreneurs and financial technology actors reveal that this grey area has resulted in an unspoken *modus vivendi*: users avoid challenging regulatory limits directly, while regulators delay formalization due to institutional limitations and lack of coordinated legal frameworks. This subtle dynamic suggests that lawmaking in emerging technological contexts is not always linear or top-down but may instead evolve through iterative processes of informal negotiation. The state's delayed responsiveness has thus not stopped the expansion of digital assets; rather, it has led to a fragmented, user-driven regulatory environment where practice often precedes policy. The findings underline the need for a more dialogic and anticipatory regulatory approach that engages stakeholders and aligns legal reform with the pace of technological innovation.

A major finding from this research is the significant lack of legal literacy among Bitcoin users in Indonesia,

³¹ Julie Frizzo-Barker et al., "Blockchain as a Disruptive Technology for Business: A Systematic Review," *International Journal of Information Management* 51 (April 2020): 102029, <https://doi.org/10.1016/j.ijinfomgt.2019.10.014>.

³² Primavera De Filippi, Morshed Mannan, and Wessel Reijers, "Blockchain as a Confidence Machine: The Problem of Trust & Challenges of Governance," *Technology in Society* 62 (August 2020): 101284, <https://doi.org/10.1016/j.techsoc.2020.101284>.

³³ Krzysztof Wołk, "Advanced Social Media Sentiment Analysis for Short-Term Cryptocurrency Price Prediction," *Expert Systems* 37, no. 2 (April 21, 2020), <https://doi.org/10.1111/exsys.12493>.

³⁴ Wessel Reijers et al., "Now the Code Runs Itself: On-Chain and Off-Chain Governance of Blockchain Technologies," *Topoi* 40, no. 4 (September 17, 2021): 821–31, <https://doi.org/10.1007/s11245-018-9626-5>.

³⁵ Alexander Savelyev, "Contract Law 2.0: 'Smart' Contracts as the Beginning of the End of Classic Contract Law," *Information & Communications Technology Law* 26, no. 2 (May 4, 2017): 116–34, <https://doi.org/10.1080/13600834.2017.1301036>.

³⁶ Rosa M. Garcia-Teruel, "Legal Challenges and Opportunities of Blockchain Technology in the Real Estate Sector," *Journal of Property, Planning and Environmental Law* 12, no. 2 (January 20, 2020): 129–45, <https://doi.org/10.1108/JPEL-07-2019-0039>.

³⁷ Eliza Mik, "Smart Contracts: Terminology, Technical Limitations, and Real World Complexity," *Law, Innovation and Technology* 9, no. 2 (July 3, 2017): 269–300, <https://doi.org/10.1080/17579961.2017.1378468>.

particularly regarding the rights and responsibilities associated with digital asset ownership.³⁸ Many users, especially those from non-technical or non-legal backgrounds, engage with cryptocurrencies primarily as a form of investment or quick-profit mechanism, without fully understanding the legal implications of their actions.³⁹ The interviews and field observations indicate that few users are aware of the regulatory restrictions imposed by Bank Indonesia or the consumer risks associated with using unlicensed platforms. In cases of loss—whether through hacking, fraud, or market manipulation—users often have no idea how to pursue legal remedies or which institutions to approach. This deficiency in legal awareness not only endangers individual users but also weakens the integrity of the broader digital economy. In a space where laws are unclear and protections are minimal, informed user behavior becomes even more essential. Therefore, the research suggests that increasing digital legal literacy is not a supplementary task but a fundamental component of building a safe and inclusive digital financial ecosystem. Legal education campaigns, user protection guides, and targeted awareness programs are urgently needed to empower users to navigate the risks of cryptocurrency use responsibly and legally.

The legal vacuum surrounding Bitcoin ownership and transaction security in Indonesia has led to a widespread reliance on foreign platforms and service providers, including international exchanges, custodial wallets, and cross-border fintech applications. The absence of national standards or government-endorsed infrastructure means that Indonesian users seeking reliability, security, and functionality often turn to platforms based in jurisdictions with clearer regulatory frameworks. While this might appear to be a rational choice, it has several long-term implications. Firstly, it reduces Indonesia's digital sovereignty, as data, assets, and transactions are processed outside national borders. Secondly, it creates enforcement challenges, as disputes that arise involving foreign platforms often fall outside the jurisdiction of Indonesian courts. Thirdly, this reliance inhibits the growth of local startups and discourages domestic innovation, since users prefer platforms with proven reputations and regulatory compliance abroad. Empirical data show that users are more comfortable entrusting large volumes of Bitcoin to platforms in countries like Singapore, the US, or Japan than to any local service, due to the perceived lack of legal recourse within Indonesia. This trend indicates a systemic failure to support the localization of crypto infrastructure and reflects the urgent need for Indonesia to develop its own secure, regulated, and trustworthy digital asset ecosystem that can protect users while reinforcing national digital and financial sovereignty.

Although some segments of the Indonesian population have begun experimenting with the use of Bitcoin in formal economic activities—such as paying for freelance services or cross-border remittances—the legal and institutional environment has not supported this integration.⁴⁰ Businesses attempting to accept Bitcoin as payment face uncertainty due to the lack of legal recognition and the threat of administrative sanctions.⁴¹ Moreover, financial institutions are prohibited from processing or facilitating cryptocurrency transactions, which isolates Bitcoin from the broader payment infrastructure.⁴² This legal isolation creates high transaction costs, discourages business adoption, and forces Bitcoin-related activities into a semi-legal status. Field interviews with entrepreneurs indicate that even when they find clients or partners willing to transact using Bitcoin, the absence of standardized contracts, accounting procedures, and tax guidance complicates implementation. Furthermore, the inability to convert Bitcoin into Rupiah within formal banking channels adds another barrier to integration. As a result, most Bitcoin economic activities remain informal, small-scale, or experimental. Without regulatory reform that provides legal certainty, defines use cases, and ensures compliance pathways, Bitcoin's integration into the formal

³⁸ Sesha Kethineni and Ying Cao, "The Rise in Popularity of Cryptocurrency and Associated Criminal Activity," *International Criminal Justice Review* 30, no. 3 (September 6, 2020): 325–44, <https://doi.org/10.1177/1057567719827051>.

³⁹ Jon Truby et al., "Blockchain, Climate Damage, and Death: Policy Interventions to Reduce the Carbon Emissions, Mortality, and Net-Zero Implications of Non-Fungible Tokens and Bitcoin," *Energy Research & Social Science* 88 (June 2022): 102499, <https://doi.org/10.1016/j.erss.2022.102499>.

⁴⁰ Emily Fletcher, Charles Larkin, and Shaen Corbet, "Countering Money Laundering and Terrorist Financing: A Case for Bitcoin Regulation," *Research in International Business and Finance* 56 (April 2021): 101387, <https://doi.org/10.1016/j.ribaf.2021.101387>.

⁴¹ Christopher Millard, "Blockchain and Law: Incompatible Codes?," *Computer Law & Security Review* 34, no. 4 (August 2018): 843–46, <https://doi.org/10.1016/j.clsr.2018.06.006>.

⁴² Fletcher, Larkin, and Corbet, "Countering Money Laundering and Terrorist Financing: A Case for Bitcoin Regulation."

economy will remain limited and risky, depriving the national economy of the innovation and efficiency that blockchain technologies could offer.

The empirical evidence gathered through this research highlights a pressing need for Indonesia to adopt a responsive legal framework that aligns with the pace of financial technological advancements. The existing legal and institutional frameworks are largely reactive and rigid, developed for conventional financial instruments and unable to accommodate the decentralized, borderless, and programmable nature of digital assets like Bitcoin. As a result, the legal system has become misaligned with technological realities,⁴³ producing uncertainty,⁴⁴ inefficiencies, and barriers to innovation.⁴⁵ Stakeholders across the ecosystem—from users and developers to regulators and legal scholars—have expressed concern over this disconnect and emphasized the necessity of reform that is both adaptive and evidence-based. Rather than imposing blanket prohibitions or outdated classifications, the state must adopt a future-oriented approach that considers global best practices,⁴⁶ encourages stakeholder participation, and incorporates pilot projects and sandboxing mechanisms to test emerging models.⁴⁷ A regulatory architecture that integrates flexibility,⁴⁸ legal clarity, and user protection will not only support innovation but also ensure legal certainty and strengthen public trust in digital financial systems. Ultimately, the research underscores that law must not merely respond to technological disruption—it must anticipate and shape it.

4. Conclusion

The results of this study reveal that the legal force of Bitcoin ownership as an electronic medium of exchange in Indonesia is still characterized by significant ambiguity and legal vacuum. Although Bitcoin has been widely used informally in various digital and peer-to-peer (P2P) transactions, especially among tech-savvy communities and digital entrepreneurs, it lacks any formal recognition or regulatory framework that would establish it as a lawful means of payment or a legally protected financial asset. Ownership of Bitcoin is entirely determined by control over the private key—a cryptographic credential that acts as the sole proof of possession—thereby creating a fundamental disconnect between legal doctrine and technological reality. The Indonesian legal system, which is grounded in civil law traditions and relies heavily on formal documentation, registration, and administrative validation, is unprepared to accommodate such a decentralized and pseudonymous mode of asset ownership. Consequently, users operate within a parallel system of property recognition that does not rely on state validation, but on technical control, exposing them to high levels of legal uncertainty, especially in instances of fraud, loss, or disputes. In this context, regulators, users, and industry actors maintain conflicting perceptions: while authorities tend to treat Bitcoin as a speculative asset or commodity, users and crypto entrepreneurs often regard it as a medium of exchange or digital currency, especially for cross-border and freelance transactions. The absence of uniform classification and consistent state enforcement not only creates regulatory fragmentation but also weakens the protection of ownership rights and legal obligations. Moreover, the lack of institutional mechanisms for registration, dispute resolution, or inheritance transfer further illustrates how the legal status of Bitcoin remains suspended between technological practice and formal legal norms.

⁴³ Venkata Marella et al., "Understanding the Creation of Trust in Cryptocurrencies: The Case of Bitcoin," *Electronic Markets* 30, no. 2 (June 9, 2020): 259–71, <https://doi.org/10.1007/s12525-019-00392-5>.

⁴⁴ Pranav Nerurkar et al., "Dissecting Bitcoin Blockchain: Empirical Analysis of Bitcoin Network (2009–2020)," *Journal of Network and Computer Applications* 177 (March 2021): 102940, <https://doi.org/10.1016/j.jnca.2020.102940>.

⁴⁵ Hossein Nabilou, "How to Regulate Bitcoin? Decentralized Regulation for a Decentralized Cryptocurrency," *International Journal of Law and Information Technology* 27, no. 3 (September 1, 2019): 266–91, <https://doi.org/10.1093/ijlit/eaz008>.

⁴⁶ Kelvin F. K. Low and Eliza Mik, "Pause the Blockchain Legal Revolution," *International and Comparative Law Quarterly* 69, no. 1 (January 19, 2020): 135–75, <https://doi.org/10.1017/S0020589319000502>.

⁴⁷ G. Ishmaev, "Blockchain Technology as an Institution of Property," *Metaphilosophy* 48, no. 5 (October 10, 2017): 666–86, <https://doi.org/10.1111/meta.12277>.

⁴⁸ Goran Sladić et al., "A Blockchain Solution for Securing Real Property Transactions: A Case Study for Serbia," *ISPRS International Journal of Geo-Information* 10, no. 1 (January 15, 2021): 35, <https://doi.org/10.3390/ijgi10010035>.

This research contributes both theoretically and practically to the growing discourse on digital asset regulation by highlighting the urgent need to reform the Indonesian legal framework to accommodate the realities of decentralized finance. Theoretically, it challenges traditional property law paradigms that are based on tangible assets and centralized control, proposing instead a broader legal understanding that accounts for cryptographic authority and the role of distributed ledger technology. Practically, it emphasizes the risks borne by users in the absence of legal remedies, insurance systems, or consumer protection bodies, especially considering that most platforms used to store and trade Bitcoin are located outside the jurisdiction of Indonesian law. The research also uncovers the emergence of informal legal norms within the crypto community, where actors navigate legitimacy through operational conduct rather than statutory compliance, indicating a growing rift between *de jure* and *de facto* legal systems. Recognizing these dynamics, this study recommends the development of adaptive legal instruments, such as voluntary ownership certification schemes, cross-sector regulatory coordination, and legal capacity building for both regulators and the public. In addition, Indonesia must engage in international regulatory dialogues to address cross-border challenges, ensure legal coherence, and reduce user exposure to transnational financial risks. While this study is limited by the rapidly evolving nature of blockchain technology and the closed nature of some user communities, it offers a foundational perspective for future research on regulatory innovation, legal pluralism in digital economies, and the socio-legal implications of cryptographic ownership.

Declarations

Author Contribution Statement

Gesa Bimantara contributed to the formulation of the research idea and design, and was responsible for data collection and the initial drafting of the article. Tri Astuti Handayani played a role in data analysis, methodology review, and the development of the theoretical framework. M. Aqiel participated in the interpretation of results and formulation of the discussion, ensuring the coherence of arguments throughout the paper. Author Alami contributed significantly to the literature review, final editing of the manuscript, and validation of content and citations. All authors have read and approved the final version of the article.

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The data that support the findings of this study are available from the corresponding author upon reasonable request. No publicly archived datasets were used or generated during the current research.

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The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

Additional Information

Correspondence and requests for materials should be addressed to gesabimantara1@gmail.com

ORCID

Gesa Bimantara  <https://orcid.org/0009-0007-4585-5255>

Tri Astuti Handayani  <https://orcid.org/0009-0006-6266-9094>

M. Aqiel Author Alami  <https://orcid.org/0009-0009-8141-3184>

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