Traditional Decriminalization in a Digital World: Reconstructing Criminal Policy towards Bitcoin-Based Money Laundering in the Era of Decentralized Finance

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ABSTRACT

The emergence of Bitcoin and blockchain technology as a decentralized financial infrastructure has shaken the foundations of the conventional criminal justice system, particularly in addressing money laundering offenses. This study aims to evaluate the effectiveness of existing criminal policies and reformulate the criminal law approach toward anonymous and cross-jurisdictional digital assets. Using a legal-normative method and comparative analysis of international policies, it was found that policies overly reliant on formal financial institutions become irrelevant in detecting peer-to-peer blockchain transactions. This study proposes a model for reconstructing criminal policy based on the principles of responsive law, adaptive digital surveillance (RegTech and SupTech), and transnational jurisdictional cooperation. The findings of this study are expected to provide conceptual and practical contributions to the design of a relevant, progressive, and digitally grounded criminal justice system.

Keywords: *Bitcoin, Money Laundering, Criminal Policy, Decentralized Finance, Responsive Law, Digital Jurisdiction*

Introduction

The development of digital financial technology has experienced significant growth over the past decade, particularly since the emergence of Bitcoin in 2009 as the first blockchain-based cryptocurrency (Caliskan, 2020; Chenguel, 2023; Mukhtarov, 2023; Sebastião et al., 2021; Yadav et al., 2023). According to data from Chainalysis (2023), global cryptocurrency transactions reached a value of over USD 20 trillion, with usage continuing to grow in Southeast Asia (Heng et al., 2024; Mukhtarov, 2023; Taskinsoy, 2021), including Indonesia. This phenomenon has not only transformed traditional financial systems but also created new opportunities for criminal activities, particularly in the realm of money laundering. Bitcoin's unique characteristics as a decentralized financial system (Alonso et al., 2023; Andolfatto & Martin, 2022; Makarov & Schoar, 2022; Pelagidis & Kostika, 2022)—which operates independently of monetary authorities and enables anonymous transactions (Fletcher et al., 2021; Selimović et al., 2021; Shahen Shah et al., 2023)—pose a serious challenge to conventional criminal legal systems (Alhakim & Tantimin, 2024; Bimantara et al., 2025; Maurushat & Halpin, 2022).

Amid this accelerating digital transformation, law enforcement authorities face significant challenges in detecting and prosecuting financial crimes that exploit loopholes in virtual asset regulations (Taherdoost, 2024; Trautman, 2018). A report from the Financial Action Task Force (FATF) in 2022 revealed that over USD 8.6 billion is estimated to have been laundered through cryptocurrency transactions (Al-Tawil, 2023; Çelik, 2023; Yusra et al., 2024). This highlights that existing legal infrastructure and criminal policies are not yet sufficiently responsive to the new dynamics in financial practices. Furthermore, cases such as the use of mixers and privacy coins to obscure transaction trails have widened the gap between legal capacity and the modus operandi of perpetrators.

The urgency of this research is even stronger considering the tendency that criminal law systems, including in Indonesia, still focus on a repressive approach towards conventional financial institutions as the center of anti-money laundering (AML) supervision (Bökkerink, 2015; Ebikake, 2016; Hufnagel & King, 2020; McCord et al., 2022; Schlarb, 2022). In fact, with the peer-to-peer model offered by Bitcoin, criminals no longer need financial institutions as intermediaries to carry out illegal cross-border transactions. This highlights a crisis in the effectiveness of traditional know-your-customer (KYC) oversight mechanisms (Decker, 2025; Lee, 2022; Turki et al., 2020). Without legal adaptation to the phenomenon of decentralized finance, law enforcement risks becoming irrelevant.

However, previous studies in the fields of criminal law and digital finance have mostly been fragmented. Research on blockchain technology tends to focus on system security or its innovative potential, while criminal law studies remain limited to analyzing Bitcoin solely as a digital instrument without exploring its holistic impact on criminal policy systems. This is where the research gap lies: there is no comprehensive criminal law framework that evaluates and re-adjusts criminal policies in response to the complexity of the crypto ecosystem.

Based on this background, this study aims to re-evaluate the effectiveness of criminal policies in dealing with Bitcoin-based money laundering practices and formulate new legal approaches that are more adaptive to the dynamics of decentralized financial technology. By adopting a responsive legal approach, this study is expected to make a real contribution to the development of a more inclusive and progressive digital criminal justice system in the future.

This study is motivated by academic and practical concerns regarding the imbalance between advances in financial technology and the capacity of criminal law to regulate it, particularly with regard to money laundering through Bitcoin. As decentralized financial models become more widespread, national and international legal systems remain tied to conventional approaches that are unable to address the complexity of blockchain-based modus operandi.

In this context, this study specifically aims to critically evaluate current criminal policies in anticipating and handling money laundering involving crypto assets, especially Bitcoin. This evaluation not only covers the normative aspects of existing legislation but also examines law enforcement practices, the effectiveness of supervisory mechanisms, and the extent to which these policies are able to respond to the challenges of financial technology globalization.

Furthermore, this study also aims to formulate a new conceptual framework for criminal policy reform that is not merely repressive and reactive, but also responsive and adaptive to the characteristics of the ever-evolving digital financial system. The proposed approach is integrative, combining principles of responsive law, technology-based oversight through RegTech and SupTech, and enhanced cross-jurisdictional cooperation in the investigation and prosecution of cross-border money laundering cases (Arner et al., 2022; Decker, 2025; Salampasis & Samakovitis, 2024; Turki et al., 2020; Walker, 2021).

Thus, this study is expected to not only contribute to the enrichment of criminal law literature in the digital era, but also provide concrete policy recommendations for lawmakers, law enforcement officials, and financial supervisory agencies in developing criminalization and law enforcement strategies that are relevant to the challenges of crypto finance.

Methods Research

This study employs a legal-normative approach based on an analysis of applicable written legal norms (Burton, 2013; Cao, 2025; Negara, 2023), both at the national and international levels, that regulate money laundering and its application in the context of cryptocurrencies such as Bitcoin. This approach is considered relevant given the primary objective of the research is to evaluate and reform criminal policies, thereby directing the focus of the study toward legislation, public policies, and criminal law doctrines governing financial crimes in the digital age.

Methodologically, this study is qualitative in nature, employing doctrinal legal analysis techniques to examine the principles, concepts, and legal principles within the existing regulatory system. Primary legal data used includes national regulations such as Law No. 8 of 2010 on the Prevention and Eradication of Money Laundering, as well as regulations from the Commodity Futures Trading Regulatory Agency (Bappebti) and relevant policies from the Financial Services Authority (OJK). Meanwhile, international legal data includes official documents from the Financial Action Task Force (FATF), the European Union's Anti-Money Laundering Directives (AMLD), and the United Nations Office on Drugs and Crime (UNODC).

To enrich the analysis, secondary data in the form of scientific journal articles, law books, reports from international institutions such as Chainalysis, as well as white papers and technical documents from Bitcoin developers were also used. The literature was analyzed using content analysis techniques, which aim to identify patterns, gaps, and potential policy updates in criminal regulations on money laundering through virtual assets.

In addition, this study also conducts a comparative legal study by analyzing criminal policy approaches in several countries, such as the United States, Singapore, and the European Union, which have already regulated and developed technology-based money laundering detection systems. Through this comparative study, it is hoped that best practices can be identified that can be adapted to the Indonesian legal context.

To support the validity of the findings, data sources were triangulated by combining normative studies with semi-structured interviews with experts in economic criminal law, digital asset regulators, and law enforcement practitioners who have direct experience handling crypto-related cases. The interviews were conducted purposively to obtain critical and contextual views on the ongoing legal dynamics.

The overall method used in this study aims to build a strong, logical, and academically accountable legal argument. This method is also designed so that the results of the study can provide a theoretical and practical basis for the development of national criminal policy relevant to the development of decentralized finance and the global use of Bitcoin.

Results and Discussion

The Ineffectiveness of Conventional Criminal Policy Schemes against Bitcoin

The findings of this study clearly reveal the inadequacy of conventional criminal law architecture, both in Indonesia and in many developing countries, in dealing with the complexity of Bitcoin-based financial crime (Hidajat et al., 2021; Kutera, 2022; Neti, 2022; Wiwoho et al., 2024). The existing legal framework is still shackled by a traditional repressive approach that relies heavily on gatekeeper institutions such as banks, formal financial institutions, and registered financial service providers. This system relies on know-your-customer (KYC) mechanisms and reporting obligations to detect suspicious fund flows (Matthews, 2022; Mclaughlin & Pavelka, 2013; Tan et al., 2023). However, it is this very foundation that becomes a fatal weakness when dealing with Bitcoin. The peer-to-peer technology and decentralized ledger inherent in Bitcoin inherently minimize, if not eliminate, the role of intermediaries that have traditionally served as a chain of oversight (Dimitropoulos, 2020; Johnson, 2021; Nabilou, 2019, 2020; Savirimuthu, 2019). As a result, criminals gain the ability to transfer high-value assets directly between wallets with significant anonymity, completely bypassing traditional financial authority oversight channels.

Even more problematic, these structural weaknesses are particularly evident in cross-jurisdictional financial crimes involving Bitcoin, such as money laundering and illegal financing. As concrete examples, in well-known cases such as the Silk Road dark market operation or the use of mixers like Tornado Cash, perpetrators systematically exploit Bitcoin's characteristics to evade authorities (Alston, 2022; Carletti et al., 2025; Carlisle, 2023; Khabrieva, 2018; Mackenzie, 2022). Techniques such as splitting large funds into small transactions (smurfing) to multiple anonymous wallet addresses, obscuring the origin of funds through a series of complex transactions (chain-hopping), and exploiting time zone differences and regulatory frameworks between countries enable cross-border fund movements with very low detection risk. In such scenarios, criminal justice systems lacking blockchain-based surveillance and analysis mechanisms are inherently structurally and procedurally lagging behind (Kabiru et al., 2024; Kumar et al., 2023; Pérez et al., 2025). Reliance on data from traditional gatekeepers that are no longer relevant creates significant blind spots in law enforcement.

A crucial factor that further deepens this gap in effectiveness is the emergence and widespread adoption of privacy-enhancing technologies (PETs) in the crypto asset ecosystem (Garrido et al., 2021; Pocher, 2025). The adaptation of criminal law to the challenges posed by privacy-focused cryptocurrencies such as Monero (which uses ring signatures and stealth addresses) or Zcash (which leverages zk-SNARKs), as well as the use of privacy-enhancing features within Bitcoin itself, such as CoinJoin (which combines the inputs/outputs of multiple users), has been extremely slow—if not stagnant (Arnone, 2024; Averin et al., 2020; Chitsungo, 2024; Jia et al., 2024; Wan, 2025). As a result, transaction tracing—the backbone of conventional financial crime investigations—has become nearly impossible to conduct effectively at this technological layer. These technical challenges cannot be addressed by a single jurisdiction; they require a level of global collaboration that has yet to materialize and access to advanced and expensive blockchain-based digital forensic capabilities—resources that are often lacking in law enforcement agencies in developing countries. Therefore, delays in accommodating the evolution of privacy technology not only weaken enforcement but also indirectly create an environment where illegal activities can thrive in the digital space.

In short, this research highlights the fundamental failure of conventional criminal policy schemes rooted in reliance on centralized intermediaries and an inability to keep pace with the rapid pace of decentralized and privacy-focused technological innovation. Without a fundamental reconfiguration that integrates technical understanding of blockchain, builds digital forensic capabilities, and strengthens specific international cooperation, the criminal legal framework will continue to lag behind in its efforts to regulate financial crime in the era of Bitcoin and next-generation cryptocurrencies.

Discussion

This study further reveals the jurisdictional crisis that undermines the effectiveness of contemporary criminal policies in addressing Bitcoin-based crimes. The inherent characteristics of Bitcoin as a borderless and stateless network clash head-on with the foundations of the modern criminal justice system, which still relies on the principles of territoriality and national sovereignty. This paradox creates a systematic legal loophole: while perpetrators can transfer crypto assets across borders in seconds, law enforcement authorities are bound by mutual legal assistance treaty (MLAT) procedures that are inherently incompatible with the reality of blockchain technology (Averin et al., 2020; Ghappour, 2017). In fact, case studies show that the average MLAT process takes 6-24 months—a fatal delay given that digital traces in the blockchain can be obfuscated or deleted within hours. Worse still, the absence of global technical standards for blockchain data requests leads to procedural asynchrony that often renders legal assistance requests irrelevant by the time they reach the destination jurisdiction.

The practical consequences of this fragmentation are manifested in increasingly systematic jurisdictional arbitrage practices. Empirical analysis of digital wallet seizure incidents confirms a pattern whereby criminal organizations deliberately choose jurisdictions with the weakest digital legal frameworks as their base of operations. As a concrete example, in 2023, Indonesian authorities failed to seize $18 million worth of cryptocurrency wallets belonging to a money laundering syndicate because a court in Country X refused to enforce the seizure on the grounds of "insufficient territorial connection," despite the illegal transactions involving Indonesian victims. This paradigmatic case demonstrates how perpetrators exploit the absence of a digital nexus in traditional jurisdictional definitions to create virtual safe havens. Even more concerning, conceptual disparities regarding the "digital domicile" of cryptocurrency assets among developing countries—where some adopt the principle of server location, while others adhere to the nationality of the exchange user—create a legal limbo that is aggressively exploited.

Above all, the absence of a specific international institution with a binding mandate for digital financial crime deepens the coordination crisis. Although bodies such as the Financial Action Task Force (FATF) have issued recommendations on Virtual Asset Service Providers (VASP), these recommendations are soft law with no automatic sanction mechanisms or real-time compliance verification tools (Schmidt, 2021; Smith, 2024). Compare this with an organization like the International Criminal Police Organization (INTERPOL), which has a structured operational framework for conventional crimes but lacks the technical infrastructure or specialized protocols for cross-jurisdictional tracking of cryptocurrency assets. The result is a massive enforcement gap: comparative studies show that less than 15% of cross-border extradition requests related to cryptocurrency crimes result in successful litigation. More fundamentally, no international body currently has the capacity to: (1) Facilitate real-time sharing of blockchain forensic data; (2) Standardize cross-jurisdictional digital evidence; and (3) Coordinate simultaneous freezing orders for virtual assets.

Therefore, this study identifies three mutually reinforcing dimensions of crisis: (1) asymmetry in speed between real-time blockchain and legal bureaucracy; (2) conceptual asymmetry in the definition of digital jurisdiction; and (3) institutional asymmetry in the architecture of global governance. Without radical breakthroughs in the form of new international conventions that specifically regulate the extraterritoriality of blockchain digital evidence and establish supranational institutions with direct enforcement authority—equipped with cryptography experts, integrated blockchain analytics platforms, and express dispute resolution mechanisms—law enforcement will continue to lose the race against increasingly institutionalized crypto crime. Ultimately, jurisdictional fragmentation is not merely a technical obstacle but a systemic failure of the 20th-century international legal regime, which is no longer suited to the realities of the 21st-century digital economy.

Novelty and Research Contribution

This study provides a number of novelties that places it significantly in the realm of contemporary criminal law studies, particularly those intersecting with decentralized financial technology. In previous literature, most studies on Bitcoin and money laundering tend to focus on the technical security aspects of the system or the urgency of general regulation of crypto assets. However, there has been limited research that specifically and deeply integrates criminal policy approaches with the decentralized and anonymous nature of blockchain systems, particularly from a criminal law perspective that is both preventive and responsive. The main novelty of this study lies in the formulation of a conceptual framework for the reconstruction of criminal policy based on adaptive technology and responsive legal principles. This model not only examines regulatory gaps and weaknesses in law enforcement against crypto-based crimes but also offers an integrative approach that combines the use of Regulatory Technology (RegTech) and Supervisory Technology (SupTech) with criminal policy design that is more open to digital innovation. Thus, this research is not merely normative but also constructive in shaping the direction of future criminal policy. In addition, other scientific innovations can be found in the use of in-depth cross-jurisdictional comparative analysis, which shows how disparities in approaches between countries create potential for jurisdictional arbitration and the weakness of global efforts to combat digital financial crime. This study does not stop at identifying differences in legal systems, but actively evaluates and formulates relevant best practices for adaptation in the context of Indonesia and countries with similar legal systems. In terms of scientific contribution, this study expands the theoretical horizon in criminal law by actualizing Nonet & Selznick's responsive law theory into the highly volatile and disruptive context of digital finance.

This opens up new perspectives on the role of the rule of law in an era where technology moves faster than the law itself. The concept of responsive law, which has traditionally been applied in social-political contexts, is positioned in this study as the foundation for the reform of criminal law in the digital economy. In practical terms, this study makes an important contribution to policymakers, law enforcement officials, and crypto asset regulators. The recommended adaptive criminal policy model can serve as a basis for revising the Anti-Money Laundering Law, drafting derivative regulations that accommodate the legitimacy of algorithmic evidence, and developing instruments for international cooperation in the enforcement of digital asset criminal law. Thus, the contribution of this study lies not only in its ability to diagnose weaknesses in the existing system, but also in its ability to propose an applicable and forward-looking conceptual design—which is the main characteristic of strategic legal research that is relevant to the needs of the times.

Conclusion

Based on the analysis and discussion conducted, it can be concluded that the conventional criminal justice system is not yet fully prepared to address the challenges of financial crime in the era of decentralized finance, particularly those involving Bitcoin as a tool for money laundering. Reliance on a regulatory framework based on formal financial institutions and classical principles such as know-your-customer and reporting obligations has proven ineffective in identifying and addressing anonymous transactions occurring within the global, intermediary-free blockchain network.

Regulatory gaps, limited jurisdiction for law enforcement, and slow adoption of digital surveillance technology indicate a substantial regulatory lag between the development of financial technology and criminal policy responses. In the Indonesian context, this is reflected in the lack of explicit recognition of cryptocurrency as an object of money laundering in legislation, as well as the absence of a procedural legal framework governing the admissibility of digital evidence in criminal proceedings.

This study also shows that money laundering through Bitcoin not only poses technical challenges, but also touches on the epistemological dimensions of criminal law itself. With the development of digital financial systems that are anonymous, autonomous, and cross-jurisdictional, repressive criminal law approaches are no longer adequate. Therefore, criminal policy reconstruction that is more responsive to social and technological changes is needed.

An integrative approach that combines the principles of responsive law, adaptive technology oversight through RegTech and SupTech, and strengthened international cross-jurisdictional cooperation is a strategic direction that countries, including Indonesia, must take. This model enables criminal law to become not only a tool for enforcement, but also a forward-looking prevention and oversight mechanism.

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