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Review paper

Threat Dynamics and Adaptation of Anti Money Laundering Regulations: A Systematic Review

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Abstract

Money laundering in Indonesia faces complex challenges driven by financial crime innovation. This study maps threats, legal developments, and technological responses in the national anti money laundering regime using a PRISMA guided systematic literature review of 25 Scopus indexed articles from 2014 to 2025. Results show four findings. First, crime patterns shift toward digital assets such as crypto and online platforms, along with risks linked to carbon policy instruments. Second, the legal framework still shows gaps in regulating virtual assets and strengthening electronic evidence. Third, there is growing use of machine learning and Regulatory Technology to improve detection and compliance. Fourth, key research gaps remain, including limited empirical studies on crypto misuse and carbon markets, weak cost benefit analysis of RegTech adoption in small and medium financial institutions, and limited attention to cultural and behavioral aspects of compliance. These findings provide a clear evidence base for policymakers and financial institutions. Future effectiveness depends on adaptive regulation, targeted technology adoption, and stronger coordination across stakeholders.

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Introduction

Money laundering is a complex transnational crime that poses a serious threat to the stability and integrity of the global and national financial system. [1, 2] This crime not only damages economic foundations but also facilitates predicate crimes such as corruption, environmental crime, and terrorism financing. [3, 4] In Indonesia, efforts to eradicate money laundering are a priority, marked by the establishment of a strong legal framework, primarily through Law No. 8 of 2010 concerning the Prevention and Eradication of Money Laundering Crimes. Indonesia's commitment is further underscored by its active participation in the Financial Action Task Force (FATF) and its regional body, the Asia/Pacific Group on Money

Laundering (APG). This membership necessitates continuous adaptation of its Anti-Money Laundering (AML) regime to meet international standards, a process that is constantly tested by the evolving dynamics of crime driven by technological advancement and new economic instruments.

Rapid developments in the digital era have created a new arena for criminals. The emergence of crypto assets (*cryptocurrencies*) and economy in online games (*online gaming economies*) presents significant challenges to legal frameworks designed to combat traditional financial crime.[1] The anonymity and ease of cross-border transactions offered by this technology creates loopholes that are vulnerable to being exploited to disguise the origin of illegal funds.[2] In addition, the development of concepts such as the Metaverse has also begun to give rise to discourses regarding the potential for more complex legal issues in the future, including in the context of Money Laundering.[3]

On the other hand, the challenges do not only come from the technology sector. Economic policies aimed at sustainable development, such as the implementation of a carbon tax, also unexpectedly open up new potential risks. The implementation of carbon taxes and carbon trading markets can be a medium for sophisticated money laundering schemes, where perpetrators buy and sell carbon credits to obscure the trail of illicit funds, potentially causing state revenue leakage.[4] This shows that any policy and technological innovation must be accompanied by a careful analysis of money laundering risks.

Facing this multidimensional challenge, various strengthening efforts have been made. In terms of technology, research is starting to explore the use of *machine learning* and artificial intelligence (AI) to improve the accuracy of suspicious transaction detection systems.[5] [6] Implementation *Regulatory Technology* (RegTech), such as *electronic Know Your Customer* (e-KYC) and automated transaction monitoring systems, are also a focus in the banking sector to improve the efficiency and effectiveness of compliance.[7] The role of forensic accountants with their investigative expertise is also considered crucial in unraveling complicated financial cases.[8]

[1] S Rusdiana and W Fitri, "Rethinking Indonesian Anti-Money Laundering Laws in the Age of Online Gaming Economies," *Nurani* 24, no. 2 (2024): 360–74, https://doi.org/10.19109/nurani.v24i2.24422.

[2] H N Widhiyanti, S M Hussein, and R Ganindha, "Indonesian Cryptocurrencies Legislative Readiness: Lessons from the United States," *Sriwijaya Law Review* 7, no. 1 (2023): 150–75, https://doi.org/10.28946/slrev.Vol7.Iss1.2138.pp150-172.

[3] S Kasiyanto and M R Kilinc, "The Legal Conundrums Of The Metaverse," *Journal of Central Banking Law and Institutions* 1, no. 2 (2022): 299–322, https://doi.org/10.21098/jcli.v1i2.25.

[4] G Lisanawati and M Kristina, "Anti-Money Laundering Law Strengthened on the Implementation of Carbon Tax in Indonesia," *Journal of Money Laundering Control* 28, no. 2 (2025): 315–26, https://doi.org/10.1108/JMLC-05-2024-0089.

[5] S Ramadhan, "Harnessing Machine Learning for Money Laundering Detection: A Criminological Theory-Centric Approach," *Journal of Money Laundering Control* 28, no. 1 (2025): 184–201, https://doi.org/10.1108/JMLC-04-2024-0083.

[6] B N Pambudi, I Hidayah, and S Fauziati, "Improving Money Laundering Detection Using Optimized Support Vector Machine," in *2019 2nd International Seminar on Research of Information Technology and Intelligent Systems, ISRITI 2019*, ed. Wibowo F.W. (Universitas Gadjah Mada, Electrical Engineering and Information Technology Department, Yogyakarta, Indonesia: Institute of Electrical and Electronics Engineers Inc., 2019), 273–78, https://doi.org/10.1109/ISRITI48646.2019.9034655.

[7] M Meiryani, G Soepriyanto, and J Audrelia, "Effectiveness of Regulatory Technology Implementation in Indonesian Banking Sector to Prevent Money Laundering and Terrorist Financing," *Journal of Money Laundering Control* 26, no. 4 (2023): 892–908, https://doi.org/10.1108/JMLC-04-2022-0059.

[8] A Prabowo, "Money Laundering and Forensic Accountin in Indonesia: Postgraduate Perspective," *International Business Management* 10, no. 23 (2016): 5633–42, https://doi.org/10.3923/ibm.2016.5633.5642.

Indonesia's active participation in the Financial Action Task Force (FATF) and its regional affiliate, the Asia/Pacific Group on Money Laundering (APG), plays a central role in shaping the country's AML framework. As a member of the APG since 1999 and a menber of FATF, Indonesia is subject to periodic mutual evaluation reviews that assess the technical compliance and effectiveness of its AML/CFT regime against the FATF Forty Recommendations. The most recent APG Mutual Evaluation Report on Indonesia highlighted both progress and persistent gaps, particularly in the areas of beneficial ownership transparency, supervision of designated non-financial businesses and professions (DNFBPs), and asset recovery mechanisms. These international obligations create a continuous pressure for legislative and institutional adaptation, making Indonesia's AML reform trajectory inseparable from its commitments to FATF/APG standards. Understanding how Indonesia responds to these international benchmarks is therefore essential context for any systematic review of its AML literature.

Although various studies have been conducted on specific aspects of money laundering in Indonesia, there is still a need to systematically map the existing research landscape. Therefore, this study aims to conduct *Systematic Literature Review* (SLR) using the PRISMA methodology (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses*). This systematic review will identify, evaluate, and synthesize relevant research evidence on the prevention and eradication of money laundering in Indonesia. Through this approach, this research will structure the main challenges, proposed solutions, and areas that still need further exploration to effectively and sustainably strengthen Indonesia's anti-money laundering regime.

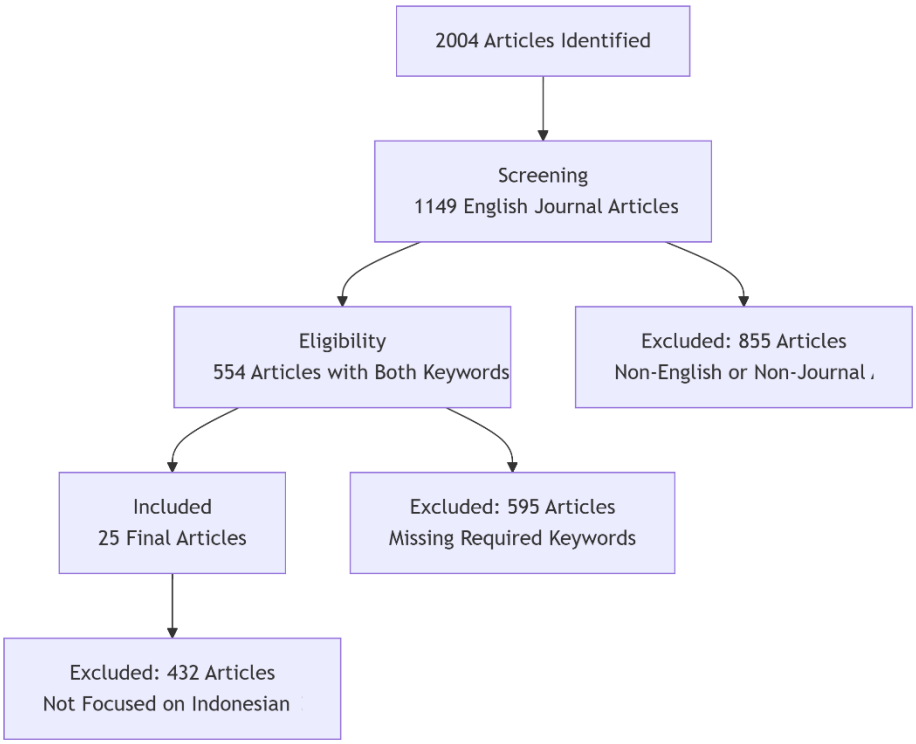

Figure 1. PRISMA Diagram

The methodology of this research is divided into three main stages, namely the formulation of research questions, study search and selection strategies, and the process of data extraction and synthesis. In the initial stage, this research is focused on formulating research questions (Research Questions / RQ) which are the main guide in searching the relevant literature.

RQ1 in this study aims to identify the main challenges and new modus operandi that have emerged in money laundering practices in Indonesia over the past decade, precisely in the period from 2014 to 2025. This question is important to understand how the pattern of money laundering crimes continues to evolve and adapt along with changes in regulations and economic dynamics.

Furthermore, RQ2 is focused on examining the effectiveness and development of the legal framework and anti-money laundering policy in Indonesia based on the findings of various published studies. Through this question, the research seeks to assess the extent to which existing regulations and policies are able to respond to the complexity of money laundering crimes at the national level.

In the context of technological advancements, RQ3 is directed to explore innovations that have been proposed or implemented to strengthen the anti-money laundering regime in Indonesia. These innovations include the application of technologies such as artificial intelligence (AI), machine learning, and regulatory technology (RegTech), as well as how their effectiveness is evaluated in various studies.

Finally, RQ4 was formulated to identify research gaps that still exist in the literature related to efforts to eradicate Money Laundering in Indonesia, as well as explore the direction and priorities of recommended research for the future. These four research questions are the foundation for this research in formulating a comprehensive synthesis and findings.

Discussion

The study selection process based on the PRISMA methodology resulted in 25 relevant literature to be synthesized. This section presents the results of a thematic analysis of the literature, organized by research questions. Each finding will be discussed in depth to provide a comprehensive understanding of the anti-money laundering landscape in Indonesia.

Key Challenges and New Modus Operandi (RQ1)

Literature analysis identifies a significant shift from traditional modus operandi to more sophisticated methods and leverages new technological innovations and policies.

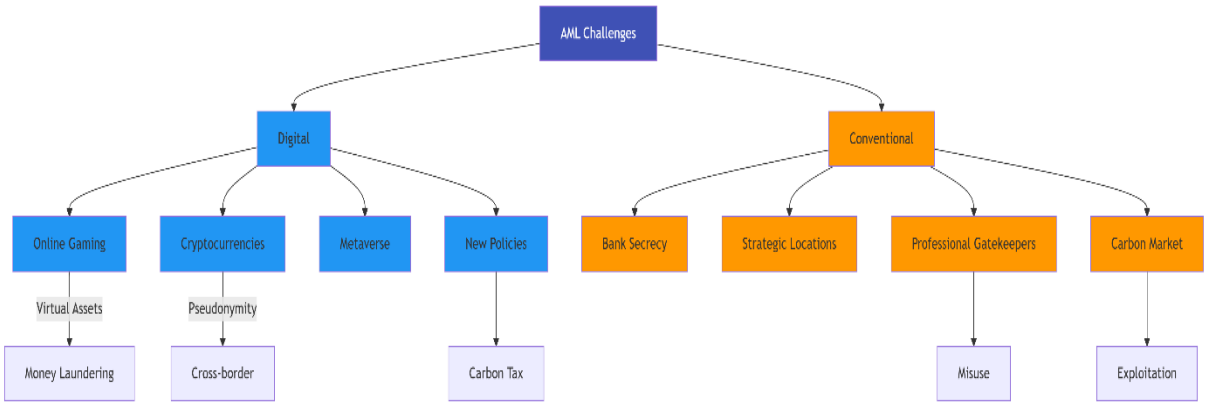

Figure 2. AML Challenges

Exploitation of the Digital Economy and Virtual Assets

The most dominant challenge highlighted in the literature is the exploitation of the digital economy. A study by Rusdiana et al. (2024) specifically highlights how *the online gaming* economy is becoming a new arena for money laundering, where virtual assets are bought with

illegal funds and resold to obscure their tracks[9]. This challenge is exacerbated by the emergence of crypto assets. Widhiyanti et al. (2023), in their comparative study with the United States, assert that *the pseudonymous* nature and ease of cross-border transfers on crypto assets make them a very vulnerable medium for money laundering in Indonesia, especially because the regulatory framework is still in the maturation stage[10]. Furthermore, Kasiyanto & Kilinc (2022) provide a futuristic view of the *metaverse*, which is predicted to give birth to much greater legal complexity, including in the case of money laundering, as it blurs the boundaries between real-world and virtual jurisdictions[11].

The identified metaverse money laundering risks in Indonesia mirror global challenges, necessitating cross-jurisdictional learning. Singapore's Payment Services Act provides a model for virtual asset regulation, while the EU's MiCA framework offers comprehensive digital asset oversight approaches. South Korea's gaming transaction monitoring and the UK's digital identity verification standards present actionable models for Indonesia's regulatory development. These international frameworks demonstrate that proactive, specialized legislation is crucial to address anonymized transactions and virtual asset flows in metaverse environments.

Table 1. Emerging Money Laundering Modus Operandi

Modus Operandi Category	Frequency	Risk Level	Regulatory Gap
Digital Assets	High	Severe	Significant
Online Gaming	Medium	Moderate	Emerging
Carbon Tax Systems	Emerging	High	Critical

Risks of New Policy Instruments: Carbon Taxes

A very relevant and new finding is the risk of money laundering arising from environmental policies. A conceptual study by Lisanawati & Kristina (2025) became a pioneer in identifying the potential for money laundering through the implementation of carbon taxes in Indonesia.[12] They argue that the carbon market, which involves carbon credit buying and selling transactions, can be exploited by criminals to disguise illicit funds through brokers, which ultimately not only threatens financial integrity but also risks causing leakage of state revenues.

Persistent Conventional Challenges

In addition to the new challenges, conventional problems still remain. The involvement of *"gatekeepers*" or professionals such as legal professionals who abuse client confidentiality is still an obstacle. Nurillah & Santoso (2021) also highlight how bank secrecy, despite being reformed, can still be a modus operandi in money laundering schemes[13]. In addition, Andiojaya et al. (2025) show that the risk of money laundering also has a geographical dimension in the

[9] Rusdiana and Fitri, "Rethinking Indonesian Anti-Money Laundering Laws in the Age of Online Gaming Economies."
[10] Widhiyanti, Hussein, and Ganindha, "Indonesian Cryptocurrencies Legislative Readiness: Lessons from the United States."
[11] Kasiyanto and Kilinc, "The Legal Conundrums Of The Metaverse."
[12] Kasiyanto and Kilinc.
[13] I Nurillah and T Santoso, "Confidentiality of Banks as Modus Operandi by Gatekeepers in Money Laundering," in *Challenges of Law and Governance in Indonesia in the Disruptive Era I* (Faculty of Law, Sriwijaya University, Palembang, Indonesia: Nova Science Publisher Inc., 2021), 209–24, https://www.scopus.com/inward/record.uri?eid=2-s2.0-85167774416&partnerID=40&md5=9120aff95d716982afdab9e0de1e494f.

country, where provinces with high economic activity and proximity to Jakarta are potential destinations for illegal fund flows[14] .

Evaluation of Legal and Policy Frameworks (RQ2)

The literature consistently acknowledges that Indonesia has built a strong legal foundation through Law No. 8 of 2010, but its implementation faces various challenges. Recent studies show that there is a gap between existing laws and the speed of technological innovation. Rusdiana et al. (2024**)** [15] and Widhiyanti et al. (2023) [16] both concluded that the definition of assets in the current AML Law does not explicitly and adequately cover virtual assets and crypto assets, thus requiring legislative reform. Latuihamallo et al. (2024), through a comparative study with the UK and the US, highlighted another weakness, namely the lack of formal regulation of electronic evidence in the criminal procedure law in Indonesia, which is crucial for proving crypto-based money laundering cases.[17]

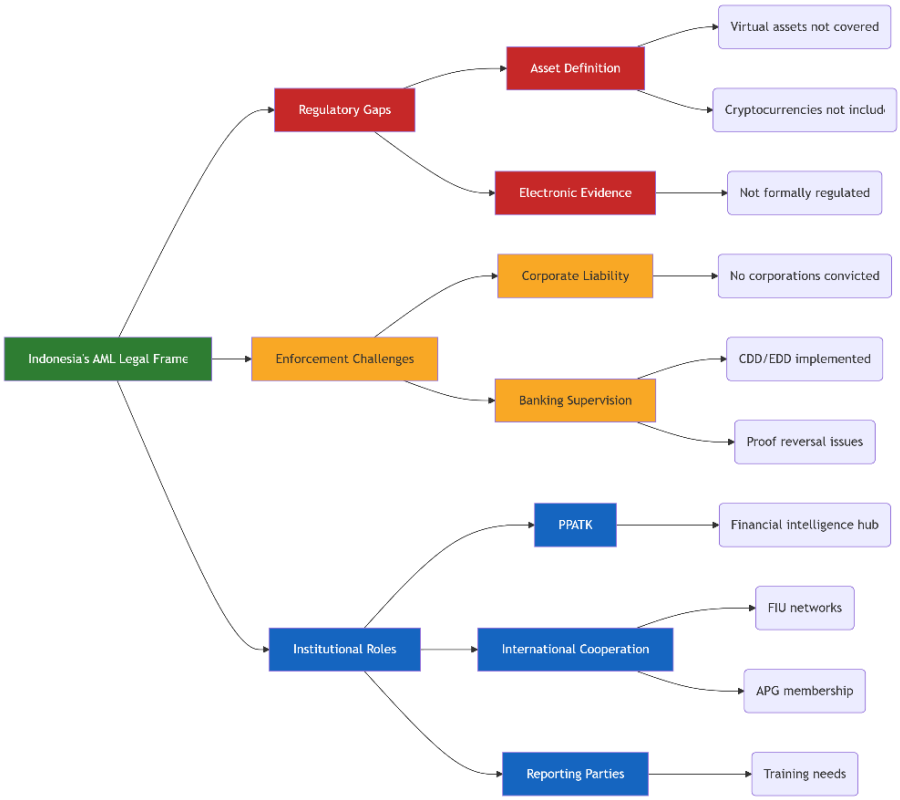

Figure 3. Evaluation of the Legal Framework

[14] A Andiojaya et al., "The Potential of Interprovincial Money Laundering in Indonesia: Investigation on the Attractiveness and Destination Choice," *Journal of Money Laundering Control* 28, no. 1 (2025): 215–34, https://doi.org/10.1108/JMLC-04-2024-0080.

[15] Rusdiana and Fitri, "Rethinking Indonesian Anti-Money Laundering Laws in the Age of Online Gaming Economies."

[16] Widhiyanti, Hussein, and Ganindha, "Indonesian Cryptocurrencies Legislative Readiness: Lessons from the United States."

[17] J R Latuihamallo and I Cahyaningtyas, "Electronic Evidence of Anti-Money Laundering Regimes: A Comparative Study Between United Kingdom, United States and Indonesia," *Journal of Law, State and Telecommunications* 16, no. 1 (2024): 189–220, https://doi.org/10.26512/lstr.v16i1.48449.

Effectiveness of Law Enforcement and Implementation

Although Wibowo (2018) found that enforcing criminal law against corporations for corruption faced significant challenges—evidenced by the absence of any successfully convicted corporations—recent developments show a shift in this trend. The successful prosecution and punishment of corporations in recent times marks a breakthrough in the implementation of the Anti-Corruption Law. Beyond corporate entities, Wangga et al. (2022) identify an equally critical gap in Indonesia's AML framework: the criminal liability of political parties. Political parties, as organizational entities capable of receiving and disbursing large sums of money—including through political campaign financing, party operational funds, and state subsidies—represent a potential vehicle for layering illicit funds. The AML Law does not yet provide an explicit and effective mechanism for attributing criminal liability to political parties as legal entities, leaving a significant enforcement gap when party funds are implicated in money laundering schemes. [18] On the other hand, Fitriyanti & Nusantara (2023)[19] noted a positive initiative from Bank Indonesia in strengthening online banking supervision through *Customer Due Diligence* (CDD) and *Enhanced Due Diligence* (EDD) obligations. However, Gumbira et al. (2022) still question whether the formulation of several articles in the AML Law, especially related to the reversal of the burden of proof, has fully guaranteed legal certainty and a sense of justice.[20]

Law No. 8/2010 establishes a robust AML foundation, yet demonstrates critical adaptation gaps in digital and corporate contexts. Comparative ASEAN analysis reveals that Singapore's Payment Services Act comprehensively regulates digital assets, while Malaysia's AML/CFT framework explicitly addresses corporate vehicle misuse. INTRAC's coordination with OJK (financial sector supervision) and BI (central banking authority) requires enhanced mechanisms, potentially through a tripartite task force for corporate cases and joint digital asset monitoring protocols to address jurisdictional overlaps and enforcement fragmentation.

The Role of Institutions and Stakeholder Cooperation

The central role of INTRAC (Indonesian Financial Transaction Reports and Analysis Center) as a financial intelligence unit is recognized as very important.[21] Fauzi et al. (2018) emphasized the importance of international cooperation carried out by INTRAC with FIU of other countries and membership in the APG as a strategic step.[22] However, the effectiveness of the AML regime also depends heavily on the active participation of the reporting side. Bin Jamil et al. (2024), in the relevant Malaysian context, found that knowledge and training for

[18] Wibowo, "Corporate Responsibility in Money Laundering Crime (Perspective Criminal Law Policy in Crime of Corruption in Indonesia)."

[19] F Fitriyanti and M A Z Nusantara, "STRENGTHENING ANTI-MONEY LAUNDERING FRAMEWORK IN ONLINE BANKING: BANK INDONESIA'S INITIATIVES AND COUNTERMEASURES," *Unissula Law Journal* 39, no. 2 (2023): 252–69, https://doi.org/10.26532/jh.v39i2.31970.

[20] S W Gumbira et al., "Assessing the Assurance of Legal Certainty and Equity of the Indonesian Law of Money Laundering," *Teaching of the Journal of Law* 9, no. 1 (2022): 1–23, https://doi.org/10.22304/pjih.v9n1.a1.

[21] Fitriyanti and Nusantara, "Strengthening Anti-Money Laundering Framework In Online Banking: Bank Indonesia's Initiatives And Countermeasures."

[22] Fauzi, Szulczyk, and Basyith, "Moving in the Right Direction to Fight Financial Crime: Prevention and Detection."

reporting officers greatly influences the decision to report suspicious transactions, an important lesson for Indonesia.[23]

Technological Innovation as a Solution (RQ3)

In response to the increasingly sophisticated modus operandi, the literature also explores the use of technology as a defense guard.

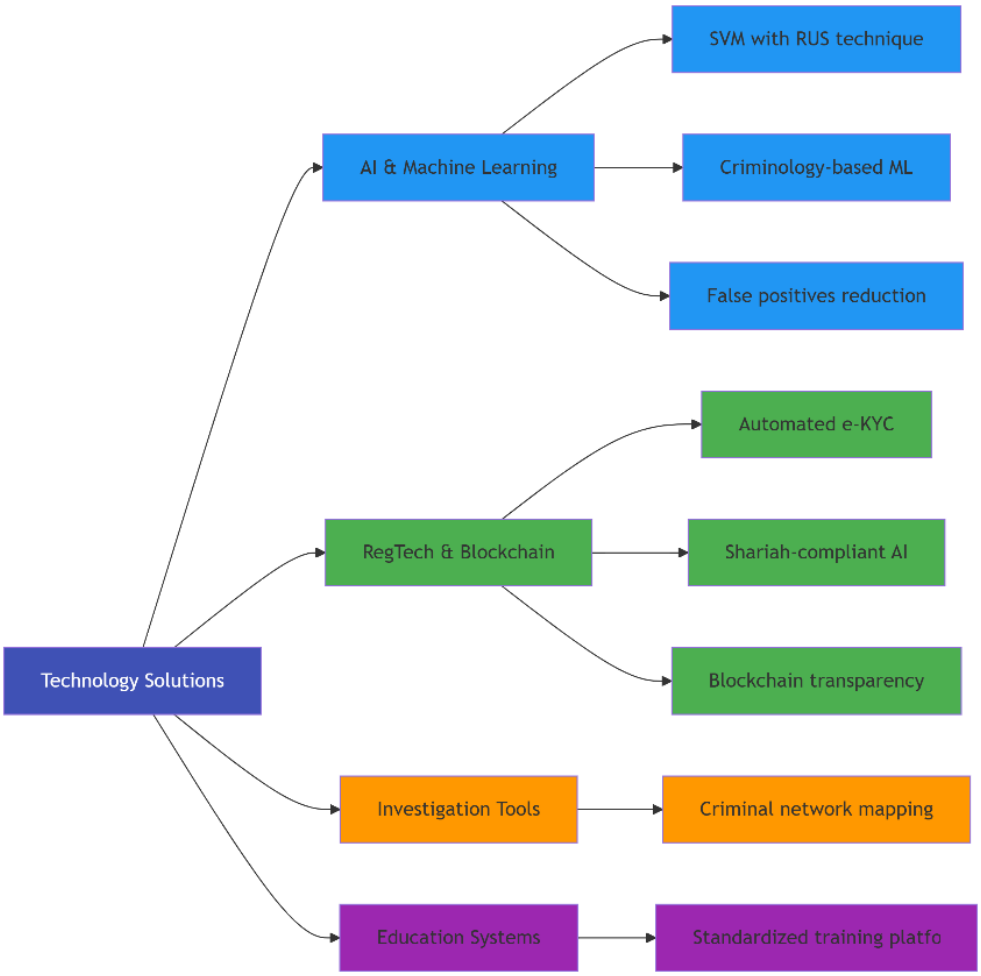

Figure 4. Technology Solution

Technological innovations—AI, machine learning, RegTech, and blockchain—offer transformative potential for AML enforcement in Indonesia. AI and machine learning enable real-time transaction monitoring and pattern recognition, while RegTech streamlines compliance processes. Blockchain provides immutable transaction records enhancing audit trails. However, these technologies introduce significant cybersecurity risks including data breach vulnerabilities and system manipulation, alongside data privacy concerns regarding mass surveillance and personal information protection under Indonesia's PDP Law.

[23] A Bin Jamil et al., "An Analysis of Suspicious Transaction Reporting Decisions in Malaysia's Money Services Business," *Edelweiss Applied Science and Technology* 8, no. 1 (2024): 24–32, https://doi.org/10.55214/25768484.v8i1.413.

Table 2. Technology-AML Function Contrast

Technology	Primary AML Function	Key Benefits	Implementation Challenges
AI & Machine Learning	Suspicious pattern detection & predictive analytics	Real-time monitoring, reduced false positives	High implementation cost, data quality dependency
RegTech	Automated compliance & reporting	Cost efficiency, standardization	Integration complexity, regulatory adaptation
Blockchain	Transaction tracing & identity verification	Immutable records, enhanced transparency	Scalability issues, interoperability concerns

Utilization of Artificial Intelligence and Machine Learning

Machine *learning technology* is emerging as a promising solution to overcome the limitations of manual detection. Pambudi et al. (2019) successfully showed that the use of *Support Vector Machine* (SVM) optimized with *the Random Under Sampling* (RUS) technique can significantly improve the detection precision of suspicious transactions on unbalanced datasets.[24] Ramadhan (2025) goes further by proposing a *Criminology-Centric Machine Learning* (CCTML) framework, which integrates criminology theory into *machine learning models* to improve the accuracy and interpretability of detection results.[25] Griece Prasethio & Murwantara (2024) also emphasized the purpose of using *machine learning* to reduce *false positives* in regional development banks.[26]

RegTech and Blockchain Implementation

The implementation of *Regulatory Technology* (RegTech) in the Indonesian banking sector has been evaluated by Meiryani et al. (2023).[27] Their study found that e-KYC and automated transaction monitoring systems have a positive effect on anti-money laundering, although their influence still needs to be improved. In the Islamic finance sector, Arsyad et al. (2025) identified the use of AI in RegTech and SupTech as crucial, but underlined the need for a legal and supervisory framework that is in line with Sharia principles.[28] Meanwhile, Hota et al. (2024) conceptually discuss *the* potential of blockchain technology to increase transparency and reduce corruption in banking, which will indirectly strengthen AML efforts.[29]

[24] Pambudi, Hidayah, and Fauziati, "Improving Money Laundering Detection Using Optimized Support Vector Machine."

[25] Ramadhan, "Harnessing Machine Learning for Money Laundering Detection: A Criminological Theory-Centric Approach."

[26] P F Griece Prasethio and I M Murwantara, "Identifying Suspicious Financial Transaction Using Machine Learning and Phytagorean Tree," in *Proceedings - 2024 2nd International Conference on Technology Innovation and Its Applications, ICTIIA 2024* (Universitas Pelita Harapan, Graduate Informatics Dept., Jakarta, Indonesia: Institute of Electrical and Electronics Engineers Inc., 2024), https://doi.org/10.1109/ICTIIA61827.2024.10761346.

[27] Meiryani, Soepriyanto, and Audrelia, "Effectiveness of Regulatory Technology Implementation in Indonesian Banking Sector to Prevent Money Laundering and Terrorist Financing."

[28] I Arsyad, D B Kharisma, and J Wiwoho, "Artificial Intelligence and Islamic Finance Industry: Problems and Oversight," *International Journal of Law and Management*, 2025, https://doi.org/10.1108/IJLMA-07-2024-0236.

[29] S L Hota et al., "Blockchain Technology and Its Potential to Mitigate Corruption in Banking," in *2024 4th International Conference on Advancement in Electronics and Communication Engineering, AECE 2024* (Kalinga Institute of Indiustrial Technology, Department of Commerce, Bhubaneswar, India: Institute of

Technology for Investigation and Education

Technology is not only for detection, but also for investigation and capacity building. Omar et al. (2014) introduced *Social Network Analysis* (SNA) as a technique to map the network of financial criminals[30]. On the other hand, Zarwono & Hidayanto (2020) designed an internal information system for the APU-PPT INTRAC Education and Training Center, showing the importance of technology in supporting the standardization and automation of the educational process for [31] stakeholders.

Gaps and Future Research Directions (RQ4)

Based on the synthesis of the literature, several gaps in research and future directions can be identified.

1. Empirical Studies on the Effectiveness of New Regulations: Most studies on new challenges such as crypto assets and carbon taxes are still conceptual or normative[32] [33]. There is an urgent need for empirical research that measures the true scale of the abuse of this medium in Indonesia and evaluates the effectiveness of mitigation measures that have been or will be taken.
2. Cost-Benefit Analysis of Technology Implementation: Although many studies propose the use of advanced technology [34] [35], research that comprehensively analyzes the cost-benefit aspects and challenges of implementing this technology in small and medium-scale financial institutions in Indonesia is still limited. Indonesia has over 1,500 rural banks (Bank Perkreditan Rakyat/BPR) and thousands of non-bank financial institutions (NBFIs) and cooperative financial entities, many of which operate with limited compliance budgets and technical infrastructure.[36] OJK's 2023 supervisory report noted that RegTech adoption remains heavily concentrated in large commercial banks, while BPRs and microfinance institutions face significant barriers in implementation cost and technical capacity. This disparity creates systemic AML vulnerabilities, as smaller institutions may serve as entry points for illicit funds that larger banks would detect[37].

Electrical and Electronics Engineers Inc., 2024), 1029–34, https://doi.org/10.1109/AECE62803.2024.10911834.

[30] N Omar et al., "Understanding Social Network Analysis (SNA) in Fraud Detection," in *Recent Trends in Social and Behaviour Sciences - Proceedings of the 2nd International Congress on Interdisciplinary Behavior and Social Sciences 2013, ICIBSoS 2013* (Accounting Research Institute, University Teknologi MARA, Shah Alam, Selangor, Malaysia: Taylor and Francis - Balkema, 2014), 543–48, https://doi.org/10.1201/b16658-99.

[31] E E Zarwono and A N Hidayanto, "Analysis and Design of Internal Information Systems of the APU-PPT Education and Training Center Using the User-Centered Design Method," in *Proceedings - 2nd International Conference on Informatics, Multimedia, Cyber, and Information System, ICIMCIS 2020* (Faculty of Computer Science, University of Indonesia, Indonesia: Institute of Electrical and Electronics Engineers Inc., 2020), 159–65, https://doi.org/10.1109/ICIMCIS51567.2020.9354312.

[32] Rusdiana and Fitri, "Rethinking Indonesian Anti-Money Laundering Laws in the Age of Online Gaming Economies."

[33] Lisanawati and Kristina, "Anti-Money Laundering Law Strengthened on the Implementation of Carbon Tax in Indonesia."

[34] Ramadhan, "Harnessing Machine Learning for Money Laundering Detection: A Criminological Theory-Centric Approach."

[35] Pambudi, Hidayah, and Fauziati, "Improving Money Laundering Detection Using Optimized Support Vector Machine."

[36] Otoritas Jasa Keuangan (OJK), *Laporan Tahunan Otoritas Jasa Keuangan 2022* (Jakarta: OJK, 2023), https://www.ojk.go.id.

[37] Otoritas Jasa Keuangan (OJK), *Laporan Pengawasan Sektor Jasa Keuangan 2023* (Jakarta: OJK, 2023), https://www.ojk.go.id.

3. The Role of Non-Traditional Actors: The focus of the literature is largely on the banking sector. Further research is needed to explore the roles and vulnerabilities of non-traditional actors such as payment service providers, *peer-to-peer lending fintech platforms*, and online game developers in the AML ecosystem.
4. Cultural and Behavioral Dimensions: A study by Mejri et al. (2022) linking culture (*cultural tightness-looseness*) to the rate of money laundering at the cross-border level paves the way for similar research in the context of sub-cultures in Indonesia. Understanding the behavioral and cultural factors that influence reporting compliance can provide new insights for policy formulation[38].
5. Development of Criminal Accountability Frameworks: As highlighted by Wangga et al. (2022) [28] regarding the criminal liability of political parties, and Wibowo (2018) [2] regarding corporations, more in-depth legal research is needed to formulate an effective and applicable criminal liability model for complex entities involved in money laundering.[39] [40]
6. Longitudinal Studies: Most studies are *cross-sectional*. Longitudinal studies that track the impact of regulatory changes or technological implementation over several years will provide stronger evidence on the effectiveness of AML policies in Indonesia.
7. Future research should address critical empirical gaps through data-driven methodologies, including big data analytics and network analysis of transaction patterns. Regulatory sandbox experiments for fintech AML solutions offer promising avenues for testing innovative technologies in controlled environments. The comprehensive table of key findings demonstrates clear alignment between identified challenges and strategic implications, though standardization of terminology would enhance comparative analysis. Interdisciplinary approaches combining legal studies, criminological theory, and technological expertise are essential to develop holistic understanding of Indonesia's evolving AML landscape, particularly in addressing behavioral aspects of money laundering and generating longitudinal evidence of regulatory effectiveness.

Overall, these discussions show that while Indonesia has made significant progress in building its AML regime, the country is in a constant race against innovative criminals. The key to future success lies in the ability to create an adaptive legal framework, adopt technology intelligently, and strengthen synergies between all stakeholders.

Table 3. Key Findings

Research Question (RQ)	Key Findings	Strategic Implications
RQ1: Key Challenges & New Modus Operandi	Exploitation of virtual assets in online gaming & crypto as a money laundering medium (Rusdiana et al., 2024; Widhiyanti et al., 2023)	Explicit regulation on virtual assets & crypto is required in the AML Act

[38] M Mejri et al., "Effect of Cultural Tightness-Looseness on Money Laundering: A Cross-Country Study," *Journal of Money Laundering Control* 25, no. 2 (2022): 414–26, https://doi.org/10.1108/JMLC-03-2021-0025.

[39] M S E Wangga et al., "Criminal Liability Of Political Parties From The Perspective Of Anti-Money Laundering Act," *Journal of Indonesian Legal Studies* 7, no. 1 (2022): 229–64, https://doi.org/10.15294/jils.v7i1.54534.

[40] Wibowo, "Corporate Responsibility in Money Laundering Crime (Perspective Criminal Law Policy in Crime of Corruption in Indonesia)."

Research Question (RQ)	Key Findings	Strategic Implications
	The potential of money laundering in the carbon market & carbon tax (Lisanawati & Kristina, 2025)	The government must implement a strict carbon transaction supervision mechanism
	Gatekeepers' involvement and bank secrecy is still an old fashion (Nurillah & Santoso, 2021; Andiojaya et al., 2025)	Law enforcement and professional transparency must be strengthened
RQ2: Evaluation of Legal & Policy Frameworks	The definition of assets in the AML Law does not yet include virtual/crypto assets (Rusdiana et al., 2024; Widhiyanti et al., 2023)	Revision of the AML Law with explicit coverage of digital assets
	Weaknesses of criminal procedure law related to electronic evidence (Latuihamallo et al., 2024)	Criminal procedure law reform for the recognition of electronic evidence
	Law enforcement against corporations is still weak (Wibowo, 2018; Wangga et al., 2022)	Criminal law enforcement against corporate entities needs to be strengthened
	PPATK/INTRAC is important, but reporters are still weak in participation (Fauzi et al., 2018; Bin Jamil et al., 2024)	Need for intensive education & training for reporting officers
RQ3: Technological Innovation as a Solution	Machine Learning improves detection of suspicious transactions (Pambudi et al., 2019; Ramadhan, 2025)	Strengthening the implementation of AI/ML in anti-money laundering (AML) systems
	e-KYC & automated monitoring to be implemented by banks (Meiryani et al., 2023; Arsyad et al., 2025)	RegTech should be integrated in bank & fintech supervision
	Blockchain has the potential to increase transparency (Hota et al., 2024)	Deeper research on the use of blockchain in the financial sector
	Technology for investigation (SNA) & AML education (Omar et al., 2014; Zarwono & Hidayanto, 2020)	Digitization of AML investigation & training for related institutions
RQ4: Gaps & Future Research Directions	Lack of empirical studies on crypto abuse & carbon taxes (Rusdiana et al., 2024; Lisanawati & Kristina, 2025)	Need for empirical data-driven research in Indonesia
	Cost-benefit analysis of technology implementation is still limited (Meiryani et al., 2023; Pambudi et al., 2019)	RegTech feasibility study in small-medium financial institutions
	The role of non-traditional actors (fintech, game developers) has not been widely researched (Rusdiana et al., 2024; Fitriyanti & Nusantara, 2023)	Expanding research focus on non-traditional sectors
	The cultural and behavioural dimensions of money laundering reporting are still under-explored (Mejri et al., 2022; Bin Jamil et al., 2024)	Behavioural studies (behavioral AML) to explore cultural factors
	The need for a criminal accountability framework for political parties and corporations (Wangga et al., 2022; Wibowo, 2018)	Development of the legal concept of collective criminal liability
	Limitations of longitudinal studies (Mejri et al., 2022; Meiryani et al., 2023)	Long-term research is needed to evaluate policy effectiveness

Conclusion and Recommendation

Money laundering threats in Indonesia have evolved significantly, shifting from conventional methods toward exploitation of digital assets, online gaming economies, and carbon tax mechanisms. These emerging modus operandi represent novel and dynamic challenges that demand equally adaptive regulatory responses. Indonesia's 2025 AML strategy and ongoing FATF mutual evaluation process must prioritize these digital and environmental-economic threat vectors to maintain effective crime prevention. Law No. 8/2010 provides a strong legal foundation, critical adaptation gaps remain in regulating virtual assets, electronic evidence, and corporate and political party criminal liability. ASEAN-aligned reforms informed by Singapore's Payment Services Act and Malaysia's AML/CFT framework are necessary. Enhanced coordination mechanisms among PPATK (INTRAC), OJK, and BI, particularly through a tripartite task force for digital asset monitoring and corporate enforcement, are essential to close existing jurisdictional gaps.

AI, machine learning, RegTech, and blockchain technologies offer transformative potential for AML enforcement in Indonesia. Evidence from the reviewed literature confirms that these tools improve detection accuracy, streamline compliance, and enhance transaction transparency. However, their adoption must be balanced against significant cybersecurity risks and data privacy obligations under Indonesia's Personal Data Protection (PDP) Law. Smart, risk-based technology integration — rather than wholesale adoption — is recommended as the strategic path forward. The study concludes that significant research gaps remain in Indonesia's AML literature, include the absence of empirical studies on crypto asset abuse and carbon market exploitation, insufficient cost-benefit analysis of RegTech for small and medium-scale financial institutions, underexplored behavioral and cultural dimensions of compliance, and limited longitudinal evidence on the effectiveness of regulatory reforms. Future research should adopt interdisciplinary, data-driven methodologies — incorporating regulatory sandbox experiments, behavioral studies, and network analysis — to build a more robust and holistic evidence base. By addressing these gaps, Indonesia can position itself as a regional leader in financial integrity, contributing meaningfully to ASEAN and global AML governance.

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