

## Analysis of Implementation of Anti-Money Laundering Mechanisms in Blockchain-Based Smart Contracts under Indonesian Regulation



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**ABSTRACT:** One of the most widely adopted forms of information technology application today is electronic trade through the internet network to make transactions. This transaction system was initially centralized, but with the risk of system failure and hacking, distributed systems such as blockchain were developed to improve security and efficiency. Blockchain also gave birth to derivative technologies such as smart contracts, automated blockchain-based digital agreements. Despite offering many advantages, the anonymity and decentralization of smart contracts raise concerns of misuse for illicit activities such as money laundering. Therefore, regulatory updates in Indonesia are needed to regulate the validity of smart contracts and money laundering actions through this technology. This article analyses the validity and regulation of smart contracts and efforts to implement the AML system in blockchain-based transactions in Indonesia.

**KEYWORDS:** Blockchain technology; smart contracts; Indonesian law; money laundering; AML

### I. INTRODUCTION

The development of technology has a great impact on community life. To improve the standard of living, people are required to follow the development of technology. In today's digital era, all activities in terms of education, social and economic have mostly switched to using digital media. The presence of the information society, which is believed to be one of the important agendas of the world community in the third millennium, is marked by the increasingly widespread use of the internet in various activities of human life, not only in developed countries but also in developing countries including Indonesia. This phenomenon has placed information as a very important and profitable economic commodity (Barkatullah, 2005).<sup>1</sup>

Electronic commerce or e-commerce is a legal event that occurs between the seller and the buyer and is carried out indirectly, namely online using the internet network and electronic devices contained in electronic agreements or contracts. E-commerce (electronic commerce) is a process of buying and selling trade transactions using electronic devices, such as telephones and the internet. The internet is very wide open to be used by the general public. In addition to being useful for communicating over long distances, it can also be used for long-distance transactions. These remote transactions can shorten time as well as fees. In addition to saving time, transactions using the internet tend to be easy because they can be done anywhere as long as they are connected to the internet network.<sup>2</sup>

Initially, this transaction system was run centrally, where all transactions were carried out on a main server run by one party or a certain company. This centralized system has a major risk when the server fails which can result in all transactions. The system is also more prone to hacking due to the potential for theft of important data. To deal with this problem, a distributed system was developed, where the process is carried out on many computer devices that are connected to work together to carry out transactions by consensus. This system is known as blockchain which has a higher level of security, transparency, and efficiency than centralized systems mainly due to the anonymous nature of transactions. The development of blockchain also encourages the emergence of derivative technologies such as smart contracts which are agreements or digital contracts that are signed and stored on the blockchain network and run automatically when the content of the agreement has been agreed. However, the anonymity and decentralized nature of blockchain-based cryptocurrencies have also raised concerns about their potential use for illicit activities,

<sup>1</sup> Abdul Halim Barkatullah, E-Commerce Business, Yogyakarta: Pustaka Siswa 2005, page 1

<sup>2</sup> Alwendi, Penerapan E-Commerce Dalam Meningkatkan Daya Saing Usaha. Journal of Business Management Vol 17, No 3, 2022

## Analysis of Implementation of Anti-Money Laundering Mechanisms in Blockchain-Based Smart Contracts under Indonesian Regulation

such as money laundering.<sup>3</sup> This is also corroborated by the anonymity of the programming techniques used in smart contracts, giving rise to the potential for new criminal acts, especially because it is difficult to track the perpetrators or parties involved in electronic transaction activities.<sup>4</sup>

The application of technology must be accompanied by the update of existing regulations in Indonesia so that every technological development brings goodness and benefits to the parties involved. Therefore, the researcher wants to examine and analyze several problem formulations as follows: 1) What is the validity and regulation that regulates smart contracts in Indonesia?; 2) How is the application of AML regulations to smart contracts in Indonesia?

### II. RESEARCH METHODOLOGY

This study employs normative legal research as the primary approach. The research focuses on analyzing the applicable laws in Indonesia regarding money laundering through smart contract technology in blockchain, as well as the implementation of Anti-Money Laundering (AML). Normative legal research emphasizes the analysis of legal texts, such as laws, government regulations, and other legal frameworks, to examine how existing laws relate to the issue at hand. This method is relevant for understanding the extent to which current regulations can address the legal challenges posed by the advancement of new technologies. The statutory approach is utilized to analyze Law No. 8 of 2010 on the Prevention and Eradication of Money Laundering (TPPU or AML), as well as Law No. 11 of 2008 on Information and Electronic Transactions (amended by Law No. 19 of 2016), in the context of their application to blockchain-based transactions and smart contracts.

The method provides a framework for assessing the alignment between new technologies and existing regulations. As the previous study Similar to the study by Destan Kirimhan (2023) in "Importance of Anti-Money Laundering Regulations Among Prosumers for a Cybersecure Decentralized Finance", this research aims to assess how decentralized finance (DeFi) systems, including smart contracts, intersect with AML regulations and how authorities can adapt their approaches to mitigating money laundering risks<sup>5</sup>. This research shares similarities with that study as both emphasize the importance of appropriate legal regulation for blockchain technology.

In addition, this method is supported by a conceptual approach to examine the basic concept of smart contracts and how they relate to traditional legal principles, such as agreement and authority in contract formation. Relevant research by Heejung Kang et al. (2018) in "A Study on the Design of Smart Contracts Mechanism Based on the Blockchain for Anti-Money Laundering" highlights that traditional legal concepts in contract law require adaptation when faced with new technologies like smart contracts<sup>6</sup>. By using this method, the study aims to explore how these concepts are applied in the Indonesian legal system and whether there are legal gaps that need to be addressed.

In the context of Indonesia, research related to the implementation of smart contracts and money laundering is still limited. However, Lim et al. (2024) have shown that legal regulations concerning smart contracts in Indonesia require significant adjustments. The research focuses on the legal challenges in applying smart contracts in the era of technological convergence, particularly concerning the validity and security of contracts<sup>7</sup>. This research is relevant to the current study as both examine the legal challenges in regulating smart contracts, particularly about the implementation of AML.

### III. DISCUSSION

Technological developments have a significant impact on people's behavior. The existence of technology also makes people creative and practical. It is said to be practical because we can do anything using technology. The use of the internet can improve community performance because it is practical and efficient in the implementation of a transaction to an agreement. Smart contracts provide a convenient solution in contracting because it overrides the distance between the parties to the agreement. A Smart Contract is a program or computer code that works based on rules or conditions that have been agreed upon and set by stakeholders/who agree to run a digital system mechanism. This smart contract is executed using a blockchain system. Blockchain is a technology that

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<sup>3</sup> Heejung Kang et al, A Study on the Design of Smart Contracts Mechanism based on the Blockchain for anti-money laundering. *Journal of Internet Computing and Services* Vol 9, No 15, 2018.

<sup>4</sup> Ari Juels et al, The Ring of Gyges: Investigating the Future of Criminal Smart Contracts. *Journal of Internet Computing and Services* Vol 9 No 15 2018

<sup>5</sup> Destan Kirimhan. Importance of Anti-Money Laundering Regulations Among Prosumers for a Cybersecure Decentralized Finance. *Journal of Business Research*, Vol. 137, 2023

<sup>6</sup> Heejung Kang, et al. A Study on the Design of Smart Contracts Mechanism Based on the Blockchain for Anti-Money Laundering. *Journal of Internet Computing and Services*, Vol. 9, No. 15, 2018.

<sup>7</sup> Lim William, et al. Smart Contracts: Validitas Hukum dan Tantangan di Masa Depan Indonesia. *Jurnal Kewarganegaraan*, Vol. 8, No. 1, 2024.

## **Analysis of Implementation of Anti-Money Laundering Mechanisms in Blockchain-Based Smart Contracts under Indonesian Regulation**

is used as a data bank or a digital data storage system<sup>8</sup>. The advantages of smart contracts are practical, efficient, and fast. So, we can take advantage of it by doing digital activities, such as doing long-distance contracts.

Smart contracts are a form of electronic contract because they are formed through an electronic system. Nick Szabo, a computer scientist and law scholar, defined smart contracts in 1994. He explained that a smart contract is a collection of promises that have been negotiated by the parties and then converted into a digital form or protocol where the parties carry out the promises that have been set.<sup>9</sup>

### **A. Validity and Regulation of Smart Contracts in Indonesia**

In the third book of the Civil Code (KUHP), article 1320 has regulated the conditions for the validity of the agreement, namely: a) There is an agreement, that is, each party agrees to implement the agreement, there is no element of coercion; b) Legal competence, namely the parties who carry out the agreement are adults according to the Law; c) A certain thing, namely having an agreed object; d) Halal causes, namely things that are agreed upon in the form of halal objects and do not violate laws and regulations. The first and second conditions are subjective conditions, which means that if one of the elements is not met, it can be canceled (*vernietigbaarheid* voidable). The third and fourth conditions are objective, meaning that if one of the elements cannot be fulfilled, the agreement is null and void.

In addition to the legal conditions of the agreement, the making of a contract must contain principles, including: 1.) The principle of consensualism (*consensus*) which states that the agreement can be said to have been completed with the agreement or conformity of the will of the parties agreeing; 2.) The principle of binding force that unites that any agreement made by the parties to force will be binding and irrevocable unilaterally; 3.) The principle of freedom of contract, which states that the parties are free to enter into the agreement they want, is not bound by a certain form.<sup>10</sup>

The regulations currently used are regulated in Law (UU) Number 19 of 2016 concerning Amendments to Law No. 11 of 2008 concerning Information and Electronic Transactions (UU ITE). In addition, it is also regulated in Government Regulation (PP) No. 71 of 2019 concerning the Implementation of Electronic Systems and Transactions. Smart Contracts make it easy to agree because it is efficient, fast, and easy to do anywhere for the parties. However, there is no definite legal umbrella to protect the parties. So that it can cause legal loopholes that can be infiltrated by parties in good faith.

The advantages of using Smart Contracts are that it makes it easier for both parties to transact in space and time, but the disadvantages are that the parties cannot face each other directly like in contracts in general, there is suspicion in maintaining privacy, there is no balance in discussing the content of the contract because the contract is prepared remotely, and other confidentiality security for legal reasons. Article 15 paragraph (1) of the Notary Office Law No. 2 of 2014 stipulates that "The Notary is authorized to make an authentic deed regarding all actions, agreements, and provisions required by laws and regulations and/or what is desired by the interested party to be made, stated in authenticity, ensuring the certainty of the date of making the deed, keeping the deed, providing Grosse, copies, and quotations." The implementation of Smart Contracts cannot be used as authentic deeds because they are made online and do not face both parties directly and also notaries as third parties, this makes smart contracts lack legal force.

In the explanation of Article 15 paragraph 3 of the Law on Notary Position No. 2 of 2014, it is stipulated that the Notary has other authority, namely as a Cyber Notary, which is expected to be the legal basis for the implementation of Smart Contracts. This Law has not regulated in detail how third parties are implemented in Smart Contracts. However, there is a legal loophole to be able to make long-distance transactions. The law can adapt to the digital era through the adoption of regulations and policies that are in line with technological advances and the needs of society. In the digital era, the law must be able to provide the highest quality public services and maintain public trust in the legal system.

### **B. Regulatory Loopholes in Decentralized Finance**

The use of blockchain technology in financial transactions is also known as Decentralized Finance (DeFi) or a distributed financial system. The use of DeFi can significantly reduce the operational costs of running the system due to the absence of servers that require maintenance and experts. These systems are run collectively on small power devices that are equivalent to home computer devices. Owners of devices connected to the system usually get cheap 'payments' through cryptocurrencies or what is commonly called 'crypto coins' such as Bitcoin, Ethereum, and other types of coins. These crypto coins can be transacted by the owner to buy a good, or service, and sell the coin into real-world currency.<sup>11</sup> The use of DeFi based on smart contracts can accelerate

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<sup>8</sup> Richardus Eko Indrajit, Smart Contract: Phenomena, opportunities and challenges in the consistency of the development of technology convergence 4.0, the material presented in the Webinar on Legal Solutions for the Development of Convergent Smart Contracts, organized by the Faculty of Law, Atma Jaya Yogyakarta 2022

<sup>9</sup> Gladyssha Indahcantika Mazalio, Problems of the application of smart contracts to the role and function of notaries in Indonesia (Indonesia Multidisciplinary Journal Vol 2 No 3 2023)

<sup>10</sup> Achmad Busro, Covenant Law Based on Book III of the Civil Code (Semarang: Printing Tree of Light 2012) page 95

<sup>11</sup> Andry Alamsyah et al, A Review on Decentralized Finance Ecosystems, Future Internet Vol 16 No 76 2024

## **Analysis of Implementation of Anti-Money Laundering Mechanisms in Blockchain-Based Smart Contracts under Indonesian Regulation**

financial transactions through process automation without going through intermediaries, thus revolutionizing various businesses such as banking, insurance, and crowdfunding.<sup>12</sup> On the other hand, transactions between crypto coins and a currency can also be used as a medium for money laundering. Perpetrators can use the system as a means to transact their assets without knowing their track record.

Research conducted by Omar Farouq et al.<sup>13</sup> found that from 2016 to 2022 22 studies had been conducted related to the implementation of smart contract regulations in various countries. The main finding of the study is that there is a discrepancy between the characteristics of smart contracts and existing regulations, so efforts are needed to align regulations with the development of smart contracts that have unique characteristics and are relatively new for most countries. Authorities should closely monitor the development of smart contracts and intervene where necessary to provide legal certainty, mitigate risks, protect vulnerable parties, support innovation, and integrate technological developments into existing legal systems.

### ***C. Anti-Money Laundering System on Smart Contract***

The main solution that can be done by policymakers is through the issuance of regulations or obligations to implement Anti-Money Laundering (AML) schemes on smart contracts where DeFi service providers are required to build an algorithm that can trace transactions in the DeFi system under certain conditions by the provisions of applicable laws. Certain conditions in question can be in the form of granting permission to law enforcement officials to investigate suspicious transaction traces or the application of a certain algorithm based on artificial intelligence (AI) that can detect a suspicious transaction (fraud).<sup>14</sup> The existence of regulations from the government is expected to be able to encourage the development of a blockchain-based system that can monitor transactions quickly and accurately. The application of AML can also be done directly in smart contracts where the program code written in the contract must be able to represent the applicable laws and regulations. The application of AML to smart contracts can prevent money laundering crimes, slightly different from the application of AML to blockchain networks that are designed to trace suspicious transactions that have occurred.

AML regulations in the banking sector apply the Know Your Customer (KYC) principle where trust in the parties involved in the transaction is the main requirement before the transaction is carried out. The KYC principle is applied in various ways, including document verification, personal identity, transaction monitoring, and the provision of certain sanctions.<sup>15</sup> The proper implementation of AML in DeFi technology is expected to create a good balance between the advantages of DeFi and compliance with existing money laundering regulations.<sup>16</sup> However, the application of AML to smart contracts also poses another challenge because it can make the DeFi system more 'open'. On the one hand, this openness is good in terms of compliance with regulations where every transaction can be monitored, but on the other hand, system openness can also give rise to the potential for cyberattacks.<sup>17</sup>

### ***D. Regulation and Application of AML to Smart Contracts in Indonesia***

In Indonesia, there is Law No. 8 of 2010 concerning the Prevention and Eradication of Money Laundering Crimes. However, the regulation does not specifically mention Money Laundering or TPPU through blockchain and its derivative technologies such as smart contracts and other derivative technologies. In terms of transactions involving electronic media, Law No. 1 of 2024 concerning the Second Amendment to Law No. 11 of 2008 concerning ITE also does not specifically mention smart contract technology or electronic money laundering, but several new articles and provisions can be closely related to efforts to prevent money laundering through this technology. However, there are relevant articles that can be used as a basis for the application of AML to smart contracts, including Articles 13A, 16A, and 16B, Article 18A, and Article 40A. Table 1 provides a summary of relevant research studies and associated legal provisions, highlighting the key focus areas of each study and the specific articles from Indonesian laws, including UU ITE, UU PSE, and UU TPPU, that apply to smart contracts and decentralized finance systems.

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<sup>12</sup> Zecheng Li et al, Securing Deployed Smart Contracts and DeFi With Distributed TEE Cluster, IEEE Transactions on Parallel and Distributed Systems Vol 34 No 3 2023

<sup>13</sup> Omar Farouq et al, Legal and Regulatory Aspects of Smart Contracts: A Systematic Review, Eurasian Journal of Management & Social Sciences 2023

<sup>14</sup> Mohammad Hasan et al, Detecting Anomalies in Blockchain Transactions using Machine Learning Classifiers and Explainability Analysis, Blockchain Research and Applications 2024

<sup>15</sup> Abhishek Thommandru and Benarji Chakka, Recalibrating the Banking Sector with Blockchain Technology for Effective Anti-Money Laundering Compliances by Banks, Sustainable Futures 2023

<sup>16</sup> Destan Kirimhan, Importance of anti-money laundering regulations among prosumers for a cyber secure decentralized finance, Journal of Business Research Vol 137 2023

<sup>17</sup> Vladlena Benson, Dark side of decentralized finance: a call for enhanced AML regulation based on use cases of illicit activities, Journal of Financial Regulation and Compliance Vol 13 No 1 2024

# Analysis of Implementation of Anti-Money Laundering Mechanisms in Blockchain-Based Smart Contracts under Indonesian Regulation

**Table 1. Summary of Relevant Studies and Legal Provisions on Smart Contracts and AML in Indonesia**

Studies	Focus	Related Laws (UU)
Heejung Kang et al. (2018)	Design of Smart Contracts Mechanism Based on Blockchain for Anti-Money Laundering (AML).	<ul style="list-style-type: none"> <li>• Law No. 8 of 2010 on AML</li> <li>• Law No. 11 of 2008 (amended by Law No. 19 of 2016) on Information and Electronic Transactions (UU ITE), including Articles 13A, 16A, 16B, 18A, 40A.</li> </ul>
Destan Kirimhan (2023)	Importance of Anti-Money Laundering Regulations Among Prosumers in Decentralized Finance (DeFi).	<ul style="list-style-type: none"> <li>• Law No. 8 of 2010 on AML</li> <li>• Law No. 11 of 2008 (amended by Law No. 19 of 2016) on Electronic Transaction, especially Articles 13A, 16A, 16B, 18A, 40A.</li> </ul>
Richardus Eko Indrajit (2022)	Legal Challenges of Implementing Smart Contracts in the Technological Convergence Era, concerning contract validity and security.	<ul style="list-style-type: none"> <li>• Law No. 8 of 2010 on AML</li> <li>• Law No. 11 of 2008 (amended by Law No. 19 of 2016) on ITE, including Articles 13A, 16A, 16B, 18A, 40A</li> <li>• Law No. 2 of 2014 on Notary Authority, especially Article 15, paragraph (1) on authentic deeds.</li> </ul>
Lim William et al. (2024)	Legal Validity and Future Challenges of Smart Contracts in Indonesia, particularly under the ITE Law and PSE Regulation.	<ul style="list-style-type: none"> <li>• Law No. 11 of 2008 (amended by Law No. 19 of 2016) on Information and Electronic Transactions (UU ITE), Articles 13A, 16A, 16B, 18A, 40A</li> <li>• PP No. 71 of 2019 on the Implementation of UU PSE.</li> </ul>

Article 13 A on digital identity and electronic certification providers includes provisions that ensure that all entities involved in electronic certification must be incorporated in Indonesia and domiciled in Indonesia. This article regulates the use of digital identity for the implementation of electronic certification, which aims to ensure that the identity of the user is verified and trustworthy. This is important in the context of blockchain and smart contracts because it ensures that all transactions are carried out by verified entities, reducing the risk of anonymity that is often exploited in money laundering. This article can also be used as a basis for creating derivative regulations related to electronic certification that include testing and certification of service providers, algorithms, or program code of a smart contract.

Articles 16A and 16 B concerning the Obligations of Electronic Channel Operators (UU PSE) must provide protection and ensure the security of electronic transactions, including transactions using blockchain technology. This means that PSE must have a mechanism in place to detect and report suspicious transactions that may be related to money laundering. The most relevant article with the term smart contract or smart contract is Article 18A concerning electronic contracts regulates international electronic contracts and provides a legal basis for their use in Indonesia. Electronic contracts in this law can provide legal certainty and protection in electronic transactions, including transactions involving smart contracts. This article can be used to encourage the fair, accountable, secure, and innovative use of electronic contracts in Indonesia. What needs to be emphasized in this article is the difference in practical definitions where smart contracts are generally used in daily activities such as buying and selling or employment agreements, while smart contracts are used in applications that require automatic execution such as crypto coin transactions, DeFi, and other blockchain-derived technologies.

In terms of law enforcement, Article 40A on Government Authority emphasizes the role of the government in creating a safe and accountable digital ecosystem. The government has the authority to supervise and enforce the law against violations of the ITE Law, including TPPU through blockchain technology. This article allows the government to monitor and crack down on suspicious activity that occurs on blockchain platforms. In addition to this article, Article 43 on Investigator Authority can also be used to close or order the closure of accounts related to illegal activities, including accounts used for money laundering on the blockchain through smart contracts. The article provides additional legal tools to prevent and crack down on money laundering activities.

## IV. CONCLUSION

Smart contracts are a form of electronic contract that is executed through a blockchain system and has the characteristics of practical, efficient, and fast. The validity of smart contracts in Indonesia is based on the legal conditions of the agreement regulated in the Civil Code (KUHPerdata) Article 1320, which includes the existence of an agreement, legal proficiency, certain objects, and halal causes. All of these conditions must be met for the contract to be considered legally valid. Regulations governing smart contracts in Indonesia are regulated in several laws, including Law No. 19 of 2016 concerning Information and Electronic Transactions and Government Regulation No. 71 of 2019 concerning the Implementation of Electronic Systems and Transactions. Although smart contracts provide convenience in making agreements, existing regulations have not fully protected the parties because there is no definite legal umbrella. Smart contracts cannot be used as authentic deeds because they are made online and do

## Analysis of Implementation of Anti-Money Laundering Mechanisms in Blockchain-Based Smart Contracts under Indonesian Regulation

not involve a notary as a third party, so they lack legal force. Article 15 paragraph (1) of the Notary Position Law No. 2 of 2014 states that notaries are authorized to make authentic deeds, but the implementation of smart contracts has not been regulated in detail in this law.

Regulations governing money laundering through blockchain and its derivative technologies, such as smart contracts, have not been specifically regulated in the law in Indonesia. However, several articles in Law No. 1 of 2024 concerning the Second Amendment to Law No. 11 of 2008 concerning ITE, such as Articles 13A, 16A, 16B, 18A, and 40A, can be used as a basis for the application of AML to smart contracts. Article 13A regulates digital identity and electronic certification providers which aims to ensure that user identities are verified and trustworthy. Articles 16A and 16B require PSEs to provide protection and ensure the security of electronic transactions, including those using blockchain technology. Article 18A regulates international electronic contracts and provides the legal basis for their use in Indonesia. Article 40A and Article 43 give the government and investigators the authority to supervise, enforce the law, and close accounts related to illegal activities, including money laundering through blockchain. The main solution to prevent money laundering through blockchain is to implement AML schemes on smart contracts. It involves building algorithms that can trace transactions in DeFi systems and using KYC principles for identity verification. Proper regulation is expected to create a balance between the benefits of DeFi and compliance with existing money laundering regulations, although the implementation of AML on smart contracts also poses challenges in maintaining the security of the system

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