

Legal Certainty of Contractual Performance in the Implementation of Digital Rupiah (CBDC) through Smart Contracts in Indonesia: A Civil Law and Legal Protection Perspective

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ABSTRACT: The emergence of Central Bank Digital Currency (CBDC) in the form of Digital Rupiah represents a fundamental transformation of Indonesia's monetary system, carrying significant implications for legal certainty in contractual performance. This research examines two primary issues: first, the legal certainty of contractual performance in the implementation of Digital Rupiah from the perspective of Indonesian civil law; and second, the forms of legal protection available to parties who suffer losses in the execution of Digital Rupiah-based smart contracts. This study employs a normative legal research method utilizing statutory, conceptual, and comparative approaches. The findings reveal that smart contracts substantially satisfy the conditions of valid agreements as stipulated in Article 1320 of the Indonesian Civil Code; however, a normative gap (*normatieve leemte*) exists regarding the validity of agreements entirely executed automatically by algorithms without continuous human intent. Legal protection for victims of smart contract losses may be pursued through the mechanism of Unlawful Acts (*Perbuatan Melawan Hukum*) under Article 1365 of the Civil Code, provisions of the Electronic Information and Transactions Law, and the consumer protection regime. This research concludes that Indonesia requires a comprehensive *lex specialis* regulatory framework to fill such normative gaps, and affirms the strategic role of notaries in providing legal certainty for Digital Rupiah-based transactions.

KEYWORDS: Digital Rupiah; CBDC; Smart Contract; Legal Certainty; Legal Protection; Notary

INTRODUCTION

The digital financial technology revolution has placed central banks around the world at a historic crossroads between monetary innovation and financial system stability. Bank Indonesia, as the highest monetary authority of the Republic of Indonesia, is preparing to implement the Digital Rupiah—a Central Bank Digital Currency (CBDC)—under the Garuda Project, which has been launched at the conceptual stage (Bank Indonesia, 2022). This project is a strategic response to the rapid growth of private cryptocurrencies and the need to modernize the national payment system in line with the Indonesia Digital 2045 vision.

Conceptually, a CBDC is a digital representation of fiat currency issued and guaranteed by a central bank, thereby serving as a legal tender (Foundational: Principles and Core Features, 2020). Unlike conventional electronic money, the Digital Rupiah operates on a distributed ledger technology (DLT) or blockchain infrastructure that enables the automated execution of agreements through smart contracts—contracts written in a programming language that execute automatically when predefined conditions are met (Nick Szabo, 1996).

The presence of smart contracts in the Digital Rupiah ecosystem opens up a new dimension that has not yet been fully addressed in Indonesian civil law. The Civil Code (KUH Perdata), a legal product inherited from the Dutch colonial era of the 19th century, was certainly not designed to anticipate agreements that are self-executing and do not require human intervention in their execution (Peter Mahmud Marzuki, 2016). A fundamental question arises: do smart contracts meet the validity requirements for agreements under Article 1320 of the Civil Code. Who is liable in the event of execution failure or losses resulting from bugs in the programming code.

Previous research (Prasetyo and Wijaya, 2023) has examined the legal aspects of smart contracts in general, but has not specifically linked them to the context of CBDCs and the Digital Rupiah. Similarly, a study (Anindita., 2022) focused on consumer protection in fintech without addressing the role of smart contracts within the CBDC ecosystem. This gap in academic research

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lends this study significant urgency and novelty.

This study aims to: (1) analyze the legal certainty of performance fulfillment in the implementation of the Digital Rupiah from the perspective of Indonesian civil law; and (2) formulate the optimal form of legal protection for parties who suffer losses in the execution of Digital Rupiah-based smart contracts. In addition, this study also examines the strategic role of notaries in providing legal certainty within the CBDC-based digital transaction ecosystem.

METHOD

This study is a normative legal research project that focuses on the analysis of existing legal norms (*das sollen*). The choice of this research method is based on the characteristics of the issues under investigation, namely the absence of legal norms and the lack of clarity in the legal framework governing CBDC smart contracts within the Indonesian legal system.

A. Research Approach

This study employs three approaches simultaneously. The statutory approach is used to analyze relevant regulations, including the Civil Code, Law No. 7 of 2011 on Currency, Law No. 11 of 2008 as amended by Law No. 19 of 2016 on Information and Electronic Transactions, Law No. 8 of 1999 on Consumer Protection, and Bank Indonesia regulations regarding payment systems.

The conceptual approach is used to examine civil law doctrines related to the validity of contracts, the theory of legal certainty, and the theory of legal protection. Meanwhile, the comparative approach is used to compare the regulatory frameworks for CBDCs and smart contracts across several jurisdictions, specifically the European Union (MiCA Regulation), Singapore, and China.

B. Legal Materials

Primary legal sources include legislation, Supreme Court case law, and official Bank Indonesia documents related to the Garuda Project. Secondary legal sources include relevant textbooks, articles from accredited journals, dissertations, and theses. Tertiary legal sources include legal dictionaries and encyclopedias for the purpose of defining technical terminology.

C. Data Collection and Analysis Methods

Legal materials were collected through library research, which included national legal databases (JDIH, Supreme Court of the Republic of Indonesia) and international databases (HeinOnline, LexisNexis, SSRN). The analysis was conducted using a prescriptive-evaluative approach, which involves assessing the suitability of existing legal norms to the issues at hand and providing *de lege ferenda* recommendations.

D. The Theory of Legal Certainty

Legal certainty is one of the fundamental objectives of law, alongside justice and utility. Gustav Radbruch asserts that legal certainty requires clarity, precision, and consistency in legal norms so that everyone can know what is permitted and what is prohibited. Lon Fuller subsequently operationalized this principle through the eight desiderata of law, including the requirement that norms be clearly formulated, not applied retroactively, and enforceable.

In the context of contract law, legal certainty manifests itself in the predictability of the legal consequences of each party's actions. Paradoxically, smart contracts provide technical certainty through automated execution, yet they have the potential to create legal uncertainty if there are no norms that explicitly recognize and regulate their status.

E. The Theory of Legal Protection

Philippus M. Hadjon distinguishes between preventive and repressive legal protections. Preventive protection aims to prevent losses through normative regulations before a dispute arises, whereas repressive protection is provided after a loss occurs through dispute resolution mechanisms. In the CBDC smart contract ecosystem, both dimensions are equally relevant: preventive protection is required through code standardization and security audits, while repressive protection is necessary through clear accountability mechanisms.

F. The Concepts of Smart Contracts and CBDCs

In 1994, Nick Szabo first introduced the concept of a smart contract as a computerized transaction protocol that automatically executes the terms of a contract. In its development, the Ethereum Foundation defined a smart contract as a program running on a blockchain and executed deterministically according to coded instructions. This determinism means that the execution result is exactly the same for every node in the network—a characteristic that has profound implications for the

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concept of intent (*wilsverklaring*) in contract law.

According to the Bank for International Settlements (BIS), a CBDC is a digital currency instrument that is a direct liability of the central bank, available in digital format, and usable for both retail and wholesale payments. The Digital Rupiah developed by Bank Indonesia is projected to be a retail CBDC that will enable peer-to-peer transactions through official digital wallets, with the potential to integrate smart contract mechanisms for programmable money applications.

RESULTS

A. Legal Certainty Regarding Performance Requirements in the Implementation of the Digital Rupiah

1. Analysis of Smart Contracts in Relation to the Valid Conditions of a Contract (Article 1320 of the Civil Code)

Article 1320 of the Civil Code requires four cumulative elements for a contract to be valid: (a) the consent of the parties; (b) the capacity to enter into a contract; (c) a specific subject matter; and (d) a lawful cause. Evaluating smart contracts against these four requirements yields complex findings.

First, regarding the element of consent (*toestemming*). In the classical legal paradigm of contracts, consent is formed through the alignment of wills actively expressed by the parties. Smart contracts replace this process with mechanisms for code deployment and digital transaction confirmation. The act of deploying or interacting with a smart contract can be construed as a declaration of intent (*wilsverklaring*) within the meaning of Article 1320 of the Civil Code, as recognized by analogy in Article 20 of the ITE Law, which governs agreements in electronic transactions.

Second, the element of legal capacity (*bekwaamheid*). Issues arise when the party interacting with a smart contract is an algorithmic entity (a bot or autonomous agent) that lacks legal personality. Indonesian civil law does not yet recognize the concept of legal personhood for non-human entities; therefore, transactions conducted entirely by algorithms without continuous human intent may raise questions regarding their validity.

Third, the requirement for a specific subject matter (*bepaald onderwerp*) is largely met because smart contracts technically define the subject matter with a high degree of precision through program code. In fact, this technical precision surpasses the clarity typically found in conventional written contracts.

Fourth, the requirement of a lawful cause (*geoorloofde oorzaak*) stipulates that the purpose of the agreement must not conflict with the law, public morality, and public order. In this context, the use of the Digital Rupiah - which is Bank Indonesia's official CBDC - inherently satisfies the requirement of a lawful cause from a public law perspective.

2. The Vacuum in Norms and Its Implications

Although, in substance, smart contracts can be structured to meet the requirements of Article 1320 of the Civil Code, there are several regulatory gaps that remain unresolved. First, the Civil Code does not provide for a mechanism to rescind (*herroeping*) an agreement that has been executed automatically and irreversibly. In conventional agreements, rescission is possible before performance is carried out; however, in smart contracts, execution and confirmation occur simultaneously, thereby closing the window for rescission.

Second, the doctrines of force majeure and *overmacht*, as set forth in Articles 1244–1245 of the Civil Code, presuppose the existence of a human agent who is physically prevented from performing an obligation. Smart contracts that fail due to bugs or cyberattacks do not clearly fall into this category. Whether technical system failures can be classified as force majeure (*overmacht*) within the meaning of the Civil Code is a question that remains unanswered in Indonesian jurisprudence.

Third, issues of jurisdiction and choice of law become complex in cross-border smart contract transactions that use the Digital Rupiah, given that the program code can be deployed on nodes located in various countries.

B. Legal Protection for Parties Against Losses in Smart Contracts

1. Liability Mechanism under Article 1365 of the Civil Code (Tort Liability)

Article 1365 of the Civil Code provides that any unlawful act that causes harm to another person obligates the person whose fault caused such harm to compensate for the resulting damages. The doctrine of unlawful acts (*onrechtmatige daad*) following the Lindenbaum-Cohen Decision (Supreme Court 1919) has evolved beyond mere violations of written norms to also encompass acts contrary to the standard of care (*zorgvuldigheid*) in society.

In the context of smart contracts, tort liability may apply to several parties. A developer or smart contract provider who intentionally or through negligence includes a bug in the program code, thereby causing harm to users, may be held liable under Article 1365 in conjunction with Article 1366 of the Civil Code. The four elements of tort must be proven: the existence of an unlawful act, the existence of fault, the existence of harm, and the existence of a causal relationship.

A practical challenge that arises is the difficulty of proving causality in a decentralized system. Unlike conventional

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contracts, where the identity of the defaulting party is clear, in pseudonymous smart contracts, tracing the identity of the perpetrator requires cooperation with authorities and blockchain service providers.

2. Protection under the ITE Law and the Consumer Protection Law

Law No. 11 of 2008, as amended by Law No. 19 of 2016, on Information and Electronic Transactions (ITE) provides a legal framework for the protection of users of electronic systems. Article 15 of the ITE Law requires electronic system operators to operate electronic systems in a reliable, secure, and responsible manner. This obligation establishes a standard of due diligence that can serve as a benchmark for accountability.

Law No. 8 of 1999 on Consumer Protection also applies if the relationship in a smart contract is between a business entity and a consumer. Article 19 of the Consumer Protection Law stipulates the obligation of business entities to provide compensation for damage, contamination, and/or losses suffered by consumers as a result of consuming the goods and/or services produced.

DISCUSSION

Amid the lack of technical regulations regarding smart contracts, notaries play a strategic role that cannot be overlooked. Law No. 2 of 2014 Amending Law No. 30 of 2004 on the Office of the Notary (UUJN) reaffirms the notary's function as a public official authorized to execute authentic deeds. Within the Digital Rupiah ecosystem, notaries can play a role in three dimensions:

- Preventive dimension: A notary can draft a wrapper agreement a master agreement in the form of a notarial deed that serves as the legal basis for a smart contract, thereby providing legal certainty regarding the parties' intentions before the code is executed.
- Verification aspect: Notaries can verify the identities of the parties and ensure their legal capacity before a party deploys or interacts with a smart contract based on the Digital Rupiah.
- Documentation aspect: A notary can create a deed that records the hash code of the smart contract, thereby providing authentic evidence of the code's content and condition at the time of deployment, which is extremely useful for resolving disputes in the future.

The European Union, through the Markets in Crypto-Assets (MiCA) Regulation of 2023, has established a comprehensive regulatory framework for crypto-assets and smart contracts, requiring the publication of a whitepaper that transparently discloses technical and legal information.¹⁶ Singapore, through the Monetary Authority of Singapore (MAS), has recognized smart contracts as legally binding contracts in certain contexts under the Electronic Transactions Act, while developing the CBDC Project Orchid. China, with its e-CNY, has taken a different approach by placing smart contracts under the full control of the Central Bank through limited programmable money.

This comparison shows that Indonesia needs to adopt a balanced approach: recognizing the validity of smart contracts while establishing appropriate limits and oversight mechanisms, taking into account the unique characteristics of the Digital Rupiah as a central bank monetary policy instrument.

CONCLUSION

Based on the analysis conducted, two key conclusions can be drawn. First, smart contracts in the context of the Digital Rupiah's implementation substantively meet the four requirements for the validity of a contract under Article 1320 of the Civil Code, although an adaptive legal construction is required for the elements of consent and legal capacity. However, there are significant regulatory gaps regarding the mechanism for canceling an executed contract, the application of the force majeure doctrine to technical system failures, and the resolution of jurisdictional conflicts in cross-border transactions. These gaps create legal uncertainty that hinders public trust in the Digital Rupiah ecosystem.

Second, legal protection for victims of losses arising from Digital Rupiah smart contracts can be sought cumulatively through: tort liability mechanisms under Article 1365 of the Civil Code against negligent developers or operators; consumer protection mechanisms under Law No. 8 of 1999; and enforcement of the obligations of electronic system operators under the ITE Law. However, the effectiveness of this protection depends on the parties' ability to prove the element of causation, which is technically challenging in a decentralized system.

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