

Legal Analysis of Smart Contracts as Electronic Agreements under Civil and Electronic Transactions Law

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Abstract

The development of Distributed Ledger Technology (DLT) and blockchain has given rise to disruptive innovations in the form of smart contracts. On the one hand, this technology offers superior efficiency, autonomy, transparency, and security compared to conventional contracts. On the other hand, the deterministic, automatic, and rigid nature of the code poses fundamental challenges to the Indonesian civil law framework, particularly the Civil Code (KUHPerdata), which is flexible and prioritizes principles such as good faith and protection against defects of consent (*wilsgebreken*). This study aims to analyze the position of smart contracts as valid agreements according to the requirements in Article 1320 of the Civil Code, as well as to examine how the Electronic Information and Transaction Law (EIT Law) and its implementing regulations, including the latest recognition in the Financial Sector Development and Strengthening Law (P2SK Law), provide legitimacy and legal certainty. This study uses a normative legal research method with a statute approach and a conceptual approach. The results of the study show that smart contracts can fulfill the requirements for a valid agreement (Article 1320 of the Civil Code) with the following caveats: the main challenge lies in fulfilling the subjective requirements (competence and agreement), which require an off-chain identity verification mechanism and separation between the agreement (natural language) and the code (execution tool).

1. Introduction

The development of digital systems has grown exponentially since the development of Distributed Ledger Technology (DLT), commonly known as blockchain. The existence of this technology has fundamentally transformed the economy and law.¹ This technology has produced innovations such as cryptocurrencies like Bitcoin. DLT has also impacted contract law, giving rise to smart contracts – agreements created, executed, and enforced through this technology.²

Technically, smart contracts in this case can be described as “computer software programs” or ‘protocols’ for digitally designed automated transactions. This system was first conceived by Nick Szabo in 1994, whereby the concept of smart contracts is executed based on “if... then...” programming logic. This means that when predetermined conditions are met (e.g., payment is received), the code will execute the commanded action (e.g., release digital assets). All of this logic and execution is recorded on the blockchain, making it immutable (unchangeable) and transparent.

¹ Berry A Harahap et al., “Perkembangan Financial Technology Terkait Central Bank Digital Currency (CBDC) Terhadap Transmisi Kebijakan Moneter Dan Makroekonomi,” *Jurnal Masharif Al-Syariah: Jurnal Ekonomi Dan Perbankan Syariah* 9, no. 3 (2024), <https://doi.org/10.30651/jms.v9i3.23293>.

² Imelda Martinelli et al., “Legalitas Dan Efektivitas Penggunaan Teknologi Blockchain Terhadap Smart Contract Pada Perjanjian Bisnis Di Masa Depan,” *UNES Law Review* 6, no. 4 (2024): 10761-76, <https://doi.org/10.31933/unesrev.v6i4.2049>.

Simply put, the existence of smart contracts as described above provides advantages that conventional contracts do not have, namely autonomy, where parties can conduct peer-to-peer transactions without the need for intermediaries (third parties). In addition, smart contracts also offer security through complex cryptographic protection and efficiency through automated execution, thereby reducing transaction costs and time.³ With its many advantages as described above, the adoption of smart contracts continues to expand into various sectors ranging from finance, Initial Coin Offerings (ICO), insurance, supply chain management, the healthcare industry (for patient data transfer), to government voting systems. However, smart contracts also create a legal paradox. This legal paradox arises as a result of the characteristics of smart contracts themselves, which are immutable and self-executing. These characteristics themselves become a problem because they are not in line with civil law systems such as Indonesia's, where conventional contracts are not as rigid but rather adhere to principles that prioritize flexibility, such as the principle of good faith in the implementation of agreements and protection for the weaker party. Civil law provides remedies if the agreement is based on defects of will (*wilsgebreken*), such as error (*dwaling*), coercion (*dwang*), or fraud (*bedrog*), which allow the contract to be canceled.⁴

The existence of contradictory characteristics and laws as described in legal terminology creates a legal vacuum (*rechtvacuum*) which, of course, the Civil Code system used in the Indonesian legal system has not been able to accommodate agreements whose existence is purely manifested in the form of codes. Although Indonesia has Law Number 11 of 2008 concerning Electronic Information and Transactions, as amended several times, most recently by Law Number 1 of 2024 (hereinafter referred to as the ITE Law), there are still ambiguities and gray areas regarding the position of smart contracts. The existence of the problems described above is a serious issue, given that rapid technological developments also require legal certainty. This means that parties using smart contracts, whether individuals or corporations, need assurance that the agreements they make on the blockchain are legally binding and can be enforced in court in the event of a dispute. The issue becomes even more complex following the enactment of Law No. 4 of 2023 concerning the Development and Strengthening of the Financial Sector (P2SK Law), which explicitly mentions and defines the term "smart contract." In light of the above, it can be explained that this research is crucial for mapping and analyzing, from a legal-normative perspective, the actual position of smart contracts in the two pillars of Indonesian contract law: (1) the Civil Code as *lex generalis* of contract law, and (2) the Electronic Information and Transactions Law as *lex specialis* (or now *lex generalis* in the electronic context)⁵ which regulates electronic transactions, as well as the implications of the latest recognition in the P2SK Law. Several recent studies have analyzed the legal standing of smart contracts in Indonesia from various perspectives. Kadly et.al

³ Syahrudin Kadir, "Keuangan Terdesentralisasi (DeFi) Dan Teknologi Keuangan (FinTech) Syariah Dalam Sistem Keuangan Abad 21," *Journal of Accounting and Finance (JACFIN)* 5, no. 2 (2023): 1-14.

⁴ Ahmad Jalaludin Arroddi et al., "Konsekuensi Hukum Cacat Kehendak Dalam Pembentukan Perjanjian Sesuai Pasal 1320 KUHPerdara," *Letterlijk* 1, no. 2 (2024): 204-16.

⁵ A Azni et al., "Legal Review Of The Application Of Online Buying And Selling Transactions In E-Commerce According To Kuhperdata And Ite Law," *Jurnal Hukum Sehasen* 10, no. 1 (2024), <https://doi.org/10.37676/jhs.v10i1.5994>.

focused on the general validity of smart contracts under the Indonesian contract law framework, examining the fulfillment of Article 1320 of the Civil Code.⁶

Furthermore, Agustianto and Situmeang explored the legal politics of smart contracts specifically within the investment sector, emphasizing the need for legal acceleration to support the digital economy.⁷ Additionally, Lofi highlighted the "faceless nature" of blockchain transactions and the challenges it poses to the principle of consensualism in the Indonesian legal system. This research distinguishes itself from these previous studies by providing a more comprehensive analysis of the legal dualism between the ITE Law (as *lex generalis*) and the P2SK Law (as *lex specialis*).⁸ While previous works focused on general validity or specific sectors like investment, this study focuses on the "legal paradox" between blockchain's technical immutability and the judicial remedies for defects of consent (*wiltsgebreken*) provided by Indonesian civil law. Based on the overall explanation as described above, the researcher intends to raise this issue in this study by formulating the existing problems into the title "Legal Analysis of Smart Contracts as a Form of Electronic Agreements in the Perspective of Civil Law and the Electronic Information and Transactions Law".

Based on the background described above, this study will focus on answering the following questions: What is the position of smart contracts as a form of agreement in the Indonesian civil law system? And how are smart contracts regulated and legitimized in the context of the Electronic Information and Transaction Law in terms of legal certainty for the parties involved? The identification of these legal issues is paramount to resolving the tension between the deterministic "Code is Law" logic and the normative "Law is Law" principle. This research is significant as it bridges the gap between technical automation and the rigid subjective requirements of valid agreements under Indonesian civil law. The primary purpose of this study is to establish a normative framework that legitimizes smart contracts as valid legal instruments while ensuring they remain subordinate to the principles of substantive justice and judicial oversight. Ultimately, this study aims to provide a clear roadmap for practitioners and regulators to navigate the evolving digital landscape, ensuring that technological efficiency does not override the fundamental protection of the parties' legal rights.

2. Methods

This study is a normative legal study, which is a study that places law as a system of norms, with a focus on the analysis of legal materials (secondary data). The research approach used is:

1. The statutory approach, which is carried out by systematically reviewing the hierarchy of relevant laws and regulations, particularly the Civil Code (KUHPerdata), the Electronic Information and Transactions Law (UU ITE), the Financial Sector

⁶ Eureka Inola Kadly, Sinta Dewi Rosadi, and Elisatris Gultom, "Keabsahan Blockchain-Smart Contract Dalam Transaksi Elektronik: Indonesia, Amerika Dan Singapura," *Jurnal Sains Sosio Humaniora* 5, no. 1 (2021): 199-212.

⁷ Agustianto Agustianto and Ampuan Situmeang, "Legal Validity of Smart Contracts for Investment Purposes: Analysis of Indonesia's Legal Politics and Emerging Challenges," *Masalah-Masalah Hukum* 54, no. 2 (2025): 269-82, <https://doi.org/10.14710/mmh.54.2.2025.269-282>.

⁸ R Mustar Lofi, "Fiksi Hukum Dalam Transaksi Elektronik: Problematika Validitas Perjanjian Dalam Era Smart Contract," *Riau Law Journal* 9, no. 1 (2025): 104-15, <https://doi.org/10.30652/05131z66>.

Development and Strengthening Law (P2SK Law), Government Regulation No. 71 of 2019 concerning the Implementation of Electronic Systems and Transactions (PP 71/2019), and Government Regulation No. 80 of 2019 concerning Trading Through Electronic Systems (PP 80/2019).

2. Conceptual approach, which is used to understand the legal meaning and concept of smart contracts themselves, as well as related legal doctrines of obligation.

The legal sources used include: (1) Primary legal sources, consisting of the laws and regulations mentioned above. (2) Secondary legal sources, in the form of scientific journal articles, legal textbooks, literature, and expert opinions (doctrine) relevant to the issue of smart contracts and electronic law.

3. Results and Discussion

3.1. The Position of Smart Contracts as a Form of Agreement in the Indonesian Civil Law System

The role of judges in the evidentiary system can be understood through the theory of separation of powers as proposed by Montesquieu, which emphasizes that judicial power must be independent from executive and legislative powers. In the context of the Indonesian criminal justice system, this independence is manifested through the freedom of judges to examine and adjudicate cases based on the law and their judicial conviction. This principle is affirmed in Article 1 of Law Number 48 of 2009 on Judicial Power, which states that “Judicial power is In this case, the focus in relation to the existence of smart contracts is their status, so it is necessary to first examine the validity of smart contracts. The existence of smart contracts can actually be said to be justified in the Civil Code because the Indonesian civil law system recognizes the principle of freedom of contract, which explains that all agreements made legally are valid as laws for those who make them. In addition to this principle, other provisions also support this as stipulated in Book Three of the Civil Code, which in this case adheres to an open legal system.

What is meant by an open legal system here is that the Civil Code does not limit the types of agreements that can be made by the parties (innominate agreements). The parties are given the freedom to draft contracts according to their wishes, including the freedom to determine the content, form, and with whom they contract. However, this does not mean that the existence of freedom of contract in Indonesia is without restrictions. In this case, this freedom is also limited by legal guidelines, namely that it must not violate the law, public order, and morality. Based on this principle, smart contracts, as a new form of agreement that was not recognized when the Civil Code was drafted, can theoretically be accepted as valid agreements, provided that they meet the fundamental requirements established by civil law as stipulated in Article 1320 of the Civil Code.⁹

⁹ Jecelyn Amanda Dethan and Yerica Evadne GiralDani Irianto, “Analisis Keabsahan Smart Contract Dalam Perjanjian Bisnis Di Indonesia,” *UNES Law Review* 7, no. 1 (2024): 462–68, <https://doi.org/10.31933/unesrev.v7i1.2291>.

The provisions of Article 1320 of the Civil Code as explained above in this case actually provide conditions that must be met by the agreement, which in this case consist of the following conditions:¹⁰

1. Their binding agreement;
2. The ability of those who enter into a contract;
3. A specific issue;
4. A permissible cause (a lawful cause);

The first and second requirements (agreement and competence) are referred to as subjective requirements, because they are attached to the subject (the parties) who make the agreement. Violation of subjective requirements results in the agreement being voidable (*vernietigbaar*). The third and fourth requirements (specific matter and lawful cause) are referred to as objective requirements, as they are inherent to the object of the agreement itself. Violation of the objective requirements results in the agreement being null and void (*nietig van rechtswege*). The various requirements described above can actually be used as an analysis of smart contracts, in which case the analysis is as follows:

1. Conditions of agreement (*consensus ad idem*)

An agreement can be described as the core of a contract. In this case, an agreement is considered important because it is a “meeting of the minds” or *consensus ad idem* between the parties. In the context of smart contracts running on blockchain, statements of intent and agreements are often expressed through technical actions, such as sending crypto assets to a specific smart contract address or through a click-wrap agreement mechanism on a decentralized application (Dapps) interface.¹¹

In relation to the existence of smart contracts themselves, the basis for analysis in this case concerns informed consent. In many cases, one party (especially consumers or ordinary users) does not have the technical ability to read, understand, let alone audit the complex programming language (code) behind the smart contract. The consent they give by clicking the “Confirm” or ‘Agree’ button is more like “blind acceptance” of a set of deterministic rules that they do not understand, rather than a genuine meeting of minds.

To resolve this problem, a legal reconceptualization is needed: the smart contract (code) should be understood not as the agreement itself, but as an execution mechanism. The actual agreement is made off-chain in natural language, containing the parties’ done by bifurcating (separating) the agreement as a legal concept and the smart contract as an execution mechanism. In other words, in this case, it can be explained that a smart contract (code) is not the agreement itself. The actual agreement is an agreement made by the parties in natural language, which occurs off-chain (outside the blockchain).¹² This agreement contains the

¹⁰ Desi Syamsiah, “Kajian Terkait Keabsahan Perjanjian E-Commerce Bila Ditinjau Dari Pasal 1320 Kuhperdata Tentang Syarat Sah Perjanjian,” *Jurnal Inovasi Penelitian* 2, no. 1 (2021): 327–32, <https://doi.org/10.47492/jip.v2i1.1443>.

¹¹ Wahyu Taufiq Abdul Aziz, “Analisis Yuridis Penggunaan Blockchain Technology Dalam Penerapan E-Residency,” *Knowledge on Sustentive Order, Litigation, Decree, Arbitration, Statute, & Imperatives* 1, no. 1 (2025): 1–16.

¹² Gabriella Mansula, “Perlindungan Hukum Atas Penyelesaian Hukum Tidak Berfungsinya Proses Transaksi Melalui Smart Contract Pada Sistem Blockchain,” *Al Qodiri: Jurnal Pendidikan, Sosial Dan Keagamaan* 21, no. 2 (2023): 787–802, <https://doi.org/10.53515/qodiri.2023.21.2.787-802>.

agreed rights and obligations (for example, “Party A agrees to sell 1 digital asset to Party B for 10 ETH”).

In this case, it can be explained that a smart contract (code) functions as a tool or agent that automatically implements or executes agreements in natural language. Thus, legal analysis of agreements in this context focuses on the extent to which the smart contract code accurately and precisely reflects the content of the agreement that was previously made in natural language. If the code deviates from the initial agreement, for example, if there is an error in the transfer of 100 ETH when only 10 ETH was agreed upon, this indicates a breach of contract (non-compliance) or *dwaling* (mistake) in translating the agreement into code.¹³ This situation does not mean that the initial agreement never existed, but rather that there was an error in its implementation through the smart contract.

2. Competency Requirements (*Bekwaaheid*)

The second subjective requirement—competence under Article 1330 is problematic in the blockchain context due to pseudo-anonymity. Parties are identified only by alphanumeric wallet addresses, with no direct connection to real-world identities. It is therefore minors (underage) and/or persons under the age of majority. The existence of this requirement itself is problematic because, in this case, it becomes an issue considering that smart contracts operating on public blockchains have the main characteristic of anonymity or, more precisely, pseudo-anonymity. Thus, the parties in blockchain transactions are generally only identified through a series of alphanumeric addresses (wallet addresses), without any direct connection to their real-world identities. This, of course, becomes a problem when linked to the provisions of Article 1330 of the Civil Code, which requires the condition of legal capacity.

This issue itself is problematic given that it is impossible to verify whether the wallet address “0x...aBc” that is the counterparty to the transaction belongs to a legally competent individual, a minor, or someone under guardianship. In conventional civil law, legal capacity is a presumption; everyone is presumed to be legally competent until proven otherwise. However, in an anonymous blockchain system, it is impossible to identify parties who may not be legally competent, making it impossible to prove incompetence (or, conversely, to prove competence).

The existence of the above problem is certainly a serious issue because a smart contract executed in a completely anonymous environment carries a high risk of being canceled at a later date if one of the parties is proven to be incompetent. In relation to the existence of this problem itself, it can be explained that in order for a smart contract to have legal certainty, it cannot be carried out or operated completely anonymously. In this case, it means that an off-chain identity verification mechanism (outside the blockchain) is still required, such as the Know Your Customer (KYC) process, before a user is allowed to interact on-chain (within the blockchain) with the smart contract.¹⁴

¹³ Aura Mayshinta and Indrati Rini, “Keabsahan Perjanjian Berbahasa Inggris Tanpa Terjemahan Bahasa Indonesia,” *DIVERSI: Jurnal Hukum* 10, no. 2 (2024): 326–57, <https://doi.org/10.32503/diversi.v10i2.5963>.

¹⁴ Muhammad Amrin Lubis et al., *Penyimpanan Data Terdesentralisasi Untuk Aplikasi Modern* (Padang: CV. Gita Lentera, 2025).

3. Requirements for a Specific Issue (Certainty of Object)

The first objective requirement in a contract is the existence of a specific subject matter (certainty of object). This means that the subject matter of the contract must be clearly identifiable, have economic value, and be legally tradable. The clarity of the subject matter is essential because without certainty regarding what the parties are to perform, a contract cannot be validly executed. In conventional legal practice, determining the object sometimes gives rise to debate, especially if the agreement is made verbally or uses ambiguous terms, thus opening up room for different interpretations.

However, this condition differs from the mechanism that applies in smart contracts. In this system, the requirement for clarity of the object is actually one of its main strengths. This is due to the basic nature of smart contracts, which are deterministic computer code, meaning that they can only operate if all elements and transaction logic have been defined precisely and definitively. Therefore, the objects of the agreement, such as the number of tokens to be transferred, the data to be recorded in the blockchain, and the conditions that trigger the execution of the contract, must all be formulated very clearly in the code. Even the slightest ambiguity will cause the system to fail or even become completely inoperable.

Therefore, in the context of smart contracts, the objective requirement of the existence of “a specific thing” is essentially almost always fulfilled. Clarity and certainty regarding the object of the agreement are technical prerequisites inherent to the functioning of the system itself. In other words, this technology inherently compels the parties to determine the object of their agreement in detail and measurably before the contract is executed, thereby reducing the potential for disputes arising from uncertainty about the object, as often occurs in conventional contracts.¹⁵

4. Requirements for a Lawful Cause

The second objective requirement in a contract is the existence of a lawful cause. The purpose of this requirement is that the content and purpose of the agreement must not conflict with laws and regulations, public order, or morality. In the context of contract law, *causa* is the legal reason behind the creation of an agreement, namely the objective that the parties wish to achieve through the legal relationship. Therefore, even though the form and mechanism of agreements have evolved, such as in the use of smart contracts, the substance of the requirement regarding lawful *causa* remains the benchmark for the validity of a contract. This principle ensures that modern legal technology is not used to violate fundamental legal values.

In practice, smart contracts are neutral, just like conventional contracts. The code in a smart contract only executes the instructions set out, without being able to assess whether the purpose of the contract is legal or illegal. This means that smart contracts can be used for lawful purposes, such as automated insurance payment systems or transparent supply chain management, but they also have the potential to be misused for illegal purposes such as money laundering, financing of illegal activities, or digital asset-based Ponzi schemes.

Therefore, the assessment of lawful *causa* requirements must still be carried out based on applicable positive law. If a smart contract is designed to execute an agreement whose purpose is lawful under Indonesian law, then this requirement is considered to be fulfilled.

¹⁵ Maghfira Yuliza Fajryani, “Kepastian Hukum Eksistensi Self-Executing Dan Perlindungan Hukum Bagi Para Pihak Pada Smart Contract Dalam Jaringan Blockchain” (Universitas Islam Indonesia, 2023).

Conversely, if the purpose is contrary to the law, then the smart contract is null and void, as is the case with conventional contracts that contain unlawful causes or purposes.

Based on the explanation above, it can be seen that the position of smart contracts in the Civil Code will become an issue if there is no update to the smart contract mechanism in order to meet the subjective requirements as stipulated in the Civil Code. Even though there is potential for improvement in the smart contract mechanism so that it can be adjusted to the Civil Code, this does not mean that the issue has been resolved. In practice, there are still other problems, namely the contradictory nature of smart contracts and conventional contracts.

The Civil Code (KUHPerdata), which emphasizes the principle of substantive justice, provides protection for parties who give their consent involuntarily as a result of error (*dwaling*), coercion (*dwang*), or fraud (*bedrog*).¹⁶ In such circumstances, the aggrieved party has the right to file for contract cancellation in court. In addition, civil law also recognizes remedies or other legal measures such as rectification (contract amendment) in the event of errors in the agreement. However, the application of this principle faces new challenges in the context of smart contracts. This is because smart contracts operating on blockchain technology are immutable, meaning that once a contract is executed, the transactions within it cannot be changed, canceled, or withdrawn. The automatic execution mechanism in this system works based on “if-then” binary logic without considering good intentions, errors, or external conditions that affect the agreement between the parties.

In such situations, a fundamental question arises as to how a court can order the cancellation of a smart contract that is technically irrevocable. The answer lies in the affirmation of the principle of the supremacy of law over code, that Law is Law, not Code is Law.¹⁷ Immutability in blockchain is merely a technical fact, not a legal norm that can override provisions in the Civil Code or court decisions. Although courts do not have the technical authority to delete or cancel transaction records that have been recorded on the blockchain (on-chain), courts still have jurisdiction over the parties in the real world (off-chain). If elements of fraud or defects of consent are found in the execution of a smart contract, the court may grant off-chain remedies such as orders for payment of damages, compensation, or restitution of assets of equivalent value to the aggrieved party. Thus, even though on-chain execution remains technically final, the legal and financial consequences of the transaction can be corrected through a court decision, thereby upholding the principle of justice without ignoring the realities of digital technology.

3.2. The Legitimacy of Smart Contracts in the Perspective of the Electronic Information and Transactions Law Regarding Legal Certainty for the Parties

If the Civil Code provides the philosophical basis for the validity of an agreement, then the Electronic Information and Transactions Law (EIT Law) and its implementing regulations provide the legal and operational basis for the validity of smart contracts as a form of electronic

¹⁶ Satria Sukananda and Wahyu Adi Mudiparwanto, “Akibat Hukum Terhadap Perjanjian Yang Mengandung Cacat Kehendak Berupa Kesesatan Atau Kekhilafan (*Dwaling*) Di Dalam Sistem Hukum Indonesia,” *Justitia Jurnal Hukum* 4, no. 1 (2020).

¹⁷ Primavera De Filippi and Samer Hassan, “Blockchain Technology as a Regulatory Technology: From Code Is Law to Law Is Code,” *First Monday* 21, no. 12 (2016), <https://doi.org/10.48550/arXiv.1801.02507>.

agreement. The EIT Law, namely Law Number 11 of 2008 as last amended by Law Number 1 of 2024, functions as a *lex generalis* that regulates various legal activities in cyberspace, including electronic transactions carried out automatically through digital systems. In this context, smart contracts can be categorized as “Electronic Contracts” as referred to in Article 1 point 17 of the ITE Law, which defines Electronic Contracts as “agreements between parties made through Electronic Systems.” Because smart contracts are created, stored, and executed entirely within a blockchain-based electronic system, they directly fulfill the elements of this definition. In other words, the existence of smart contracts has legal legitimacy in Indonesia as long as they are created in accordance with the principles and mechanisms stipulated in the ITE Law.

Furthermore, in terms of agreement formation, the ITE Law also provides a strong legal basis through the recognition of Electronic Signatures (TTE). In blockchain technology, the use of private keys by users to authorize transactions or sign smart contract execution agreements can be equated with ES as regulated in Article 1 point 12 of the ITE Law in conjunction with Government Regulation Number 71 of 2019. This provision explains that ES functions as a means of verifying and authenticating the identities of the parties involved.¹⁸ Thus, private keys in blockchain systems serve as a means of proving ownership and approval of transactions. This means that these digital actions have the same legal force as conventional signatures. Therefore, both in form and mechanism, smart contracts can be considered legally valid as electronic agreements that bind the parties under the Indonesian national legal framework.

One way to legitimize the self-executing nature of smart contracts in the ITE Law in practice is through the existence of “Electronic Agents.” Referring to the provisions of Article 1 of the ITE Law, Electronic Agents can be described as devices in an Electronic System created to perform actions on certain Electronic Information automatically, organized by People. The existence of this definition itself can actually be explained to describe what a smart contract is, because in this case a smart contract is a “device” (program code) in an “Electronic System” (blockchain) that is “created to perform actions” (transfer assets, record data) “automatically” (self-executing).

This legitimacy is reinforced by the implementing regulations of the ITE Law, namely Government Regulation Number 80 of 2019 concerning Trade Through Electronic Systems (PP 80/2019). Article 47 of PP 80/2019 explicitly states that Electronic Contracts can be formed through interaction with automated devices (Electronic Agents), and the validity of such contracts cannot be questioned simply because no physical person was directly involved in the formation process. Thus, the combination of the ITE Law (as Electronic Contracts and Electronic Agents) and PP 80/2019 (Article 47) has provided a solid legal basis for the recognition of smart contracts that operate automatically. This interpretative basis has now

¹⁸ Ronan Steven Tjandra, Veriani Nur Dewi Murni, and Bimahri Qaulan Layyina, “Deviiasi Penggunaan Blockchain Dalam Praktik Kenotariatan Modern Di Indonesia,” *UNES Law Review* 7, no. 4 (2025): 1349–62, <https://doi.org/10.31933/unesrev.v7i4.2460>.

been explicitly confirmed in Law No. 4/2023 concerning the Development and Strengthening of the Financial Sector (P2SK Law).¹⁹

Although the Financial Sector Development and Strengthening Law (P2SK Law) is essentially a law that focuses on the financial sector and functions as *lex specialis*, the explanation of Article 44 paragraph (1) in the law actually provides an important breakthrough for the development of digital law in Indonesia.²⁰ This explanation presents the first and only legal definition that officially recognizes the term “smart contract” in the national legal system. The explanation states that a smart contract is “a series of agreements that are digitized and translated into a computer protocol format, so that the rights and obligations of the parties can be executed automatically through an electronic system.” This definition is very significant because it successfully summarizes the two main characteristics of smart contracts: first, that agreements are translated into computer protocols that can be read and executed by digital systems; and second, that their execution is automatic without requiring human intervention once the agreement has been approved. With this recognition, the concept of smart contracts is no longer in a legal gray area, but has gained legal legitimacy based on Indonesian legislation.

Furthermore, Article 44 paragraph (2) of the P2SK Law emphasizes that smart contracts and their printouts have the status of valid legal evidence in dispute resolution. This provision provides concrete legal force for the use of smart contracts in the financial sector, so that digital contracts are not only viewed as technological innovations, but also as legal instruments that can be used as a basis for enforcing the rights and obligations of the parties. This explicit recognition also puts an end to the long debate among academics and legal practitioners about whether smart contracts are legally recognized in Indonesia. The answer is now clear: yes, they are explicitly recognized by law. Thus, the P2SK Law not only expands the scope of regulation in the financial sector but also strengthens the national legal foundation for the use of blockchain-based technology in digital economic activities.

The recognition of smart contracts in the P2SK Law has given rise to an interesting legal consequence, namely the formation of what can be referred to as dualism of legal certainty in Indonesia. In this case, the ITE Law functions as *lex generalis*, which regulates all forms of electronic transactions in general, while the P2SK Law acts as *lex specialis*, which regulates the specific application of smart contracts in the financial domain, such as in the capital market, crypto assets, foreign exchange, and financial technology innovations under the supervision of the Financial Services Authority (OJK). From this perspective, two levels of legal certainty emerge. First, strong legal certainty for the use of smart contracts in the financial sector, as it is explicitly regulated by *lex specialis* (P2SK Law). Second, interpretative legal certainty for the non-financial sector, such as in the fields of supply chain management, e-commerce, voting

¹⁹ Jerry Peryanto, Diana Ria W Napitupulu, and Paltiada Saragi, “Perlindungan Hukum Bagi Pengguna Cryptocurrency Menurut UU No. 4 Tahun 2023 Tentang P2SK.,” *Jurnal Kolaboratif Sains* 8, no. 5 (2025): 2432–46, <https://doi.org/10.56338/jks.v8i5.7576>.

²⁰ Rifka Lolyana Oktavia Sitorus et al., “Analisis Yuridis Keabsahan Smart Contract Sebagai Bentuk Perjanjian Elektronik Di Indonesia,” *Jurnal Ilmiah Penelitian Mahasiswa* 3, no. 6 (2025): 394–406, <https://doi.org/10.61722/jipm.v3i6.1677>.

systems, or the healthcare industry, which still depend on the interpretation of general provisions in the ITE Law, particularly through the concept of “Electronic Agents”.²¹

These two legal frameworks are complementary. The P2SK Law provides explicit precedents and legitimacy that can be used as interpretative references for the application of smart contracts outside the financial sector, while the ITE Law remains the general basis that guarantees the validity of electronic agreements in general. Thus, Indonesia's legal system now has a layered structure that provides space for the development of digital legal technology without losing normative certainty. Going forward, it is likely that this legal framework will continue to evolve, especially if the government issues implementing regulations that expand recognition of cross-sector smart contracts.

In comparison, regulatory models in other countries such as Singapore demonstrate a more integrated approach to the legitimacy of smart contracts. Under the Electronic Transactions Act (ETA), Singapore emphasizes two main pillars to ensure the legal validity of digital transactions: first, the existence of clear and consistent regulatory guidelines from national authorities; and second, the availability of a verified and integrated digital identity infrastructure through the “Sign with SingPass” system. This approach shows that the successful implementation of smart contracts depends not only on technological aspects, but also on the support of a strong digital identity (digital ID) system to ensure that the parties meet the legal requirements. This model can be a valuable lesson for Indonesia in developing a digital legal system that not only recognizes smart contracts legally, but also guarantees the integrity and security of identities in every electronic transaction in the future

4. Conclusions

Based on the explanation above, it can be concluded that smart contracts can be considered valid agreements under Article 1320 of the Civil Code, but are conditionally valid, because the fulfillment of subjective requirements (competence and agreement) requires off-chain mechanisms such as identity verification and separation between code (execution tools) and natural language agreements. This challenge arises due to the anonymous nature of blockchain and the complexity of code that hinders informed consent. Although the immutable nature of smart contracts contradicts the remedy for defects of consent in the Civil Code, the supremacy of law still applies through off-chain remedies (compensation) by the court. On the other hand, the legitimacy of smart contracts in Indonesian positive law has been significantly strengthened. Initially recognized interpretively through the ITE Law as “Electronic Contracts” and “Electronic Agents” (supported by PP 80/2019), smart contracts have now received explicit legal recognition as “smart contracts” in the Explanation of Article 44 paragraph (1) of the P2SK Law, which functions as *lex specialis* that complements the *lex generalis* of the ITE Law.

5. Reference

Agustianto, Agustianto, and Ampuan Situmeang. “Legal Validity of Smart Contracts for Investment Purposes: Analysis of Indonesia’s Legal Politics and Emerging Challenges.” *Masalah-Masalah Hukum* 54, no. 2 (2025): 269–82.

²¹ Sebastian Areen Chic and Muhammad Fardian Bilqisthi, “Tantangan Dan Peluang Blockchain Di Era Digital Dalam Bidang Keamanan Data Dan Transaksi Digital.,” *Journal of Comprehensive Science (JCS)* 3, no. 11 (2024), <https://doi.org/10.59188/jcs.v3i11.2887>.

- <https://doi.org/10.14710/mmh.54.2.2025.269-282>.
- Arrodli, Ahmad Jalaludin, Andika Ramadhan, Depi Dwi Pamungkas, Denis Zakia Muhammad, and Dikha Anugrah. "Konsekuensi Hukum Cacat Kehendak Dalam Pembentukan Perjanjian Sesuai Pasal 1320 KUHPerdara." *Letterlijk* 1, no. 2 (2024): 204-16.
- Aziz, Wahyu Taufiq Abdul. "Analisis Yuridis Penggunaan Blockchain Technology Dalam Penerapan E-Residency." *Knowledge on Sustentive Order, Litigation, Decree, Arbitration, Statute, & Imperatives* 1, no. 1 (2025): 1-16.
- Azni, A, W Timur, F Royani, and H Hurairah. "Legal Review Of The Application Of Online Buying And Selling Transactions In E-Commerce According To Kuhperdata And Ite Law." *Jurnal Hukum Sehasen* 10, no. 1 (2024). <https://doi.org/10.37676/jhs.v10i1.5994>.
- Chic, Sebastian Areen, and Muhammad Fardian Bilqisthi. "Tantangan Dan Peluang Blockchain Di Era Digital Dalam Bidang Keamanan Data Dan Transaksi Digital." *Journal of Comprehensive Science (JCS)* 3, no. 11 (2024). <https://doi.org/10.59188/jcs.v3i11.2887>.
- Dethan, Jecelyn Amanda, and Yericia Evadne GiralDani Irianto. "Analisis Keabsahan Smart Contract Dalam Perjanjian Bisnis Di Indonesia." *UNES Law Review* 7, no. 1 (2024): 462-68. <https://doi.org/10.31933/unesrev.v7i1.2291>.
- Fajryani, Maghfira Yuliza. "Kepastian Hukum Eksistensi Self-Executing Dan Perlindungan Hukum Bagi Para Pihak Pada Smart Contract Dalam Jaringan Blockchain." Universitas Islam Indonesia, 2023.
- Filippi, Primavera De, and Samer Hassan. "Blockchain Technology as a Regulatory Technology: From Code Is Law to Law Is Code." *First Monday* 21, no. 12 (2016). <https://doi.org/10.48550/arXiv.1801.02507>.
- Harahap, Berry A, Pakasa Bary Idham, Anggita Cinditya M Kusuma, and Robbi Nur Rakhman. "Perkembangan Financial Technology Terkait Central Bank Digital Currency (CBDC) Terhadap Transmisi Kebijakan Moneter Dan Makroekonomi." *Jurnal Masharif Al-Syariah: Jurnal Ekonomi Dan Perbankan Syariah* 9, no. 3 (2024). <https://doi.org/10.30651/jms.v9i3.23293>.
- Kadir, Syahrudin. "Keuangan Terdesentralisasi (DeFi) Dan Teknologi Keuangan (FinTech) Syariah Dalam Sistem Keuangan Abad 21." *Journal of Accounting and Finance (JACFIN)* 5, no. 2 (2023): 1-14.
- Kadly, Eureka Inola, Sinta Dewi Rosadi, and Elisatris Gultom. "Keabsahan Blockchain-Smart Contract Dalam Transaksi Elektronik: Indonesia, Amerika Dan Singapura." *Jurnal Sains Sosio Humaniora* 5, no. 1 (2021): 199-212.
- Lofi, R Mustar. "Fiksi Hukum Dalam Transaksi Elektronik: Problematika Validitas Perjanjian Dalam Era Smart Contract." *Riau Law Journal* 9, no. 1 (2025): 104-15. <https://doi.org/10.30652/05131z66>.
- Lubis, Muhammad Amrin, M Achsan Isa Al Anshori, Khairunnisa Khairunnisa, Mursyid Ardiansyah, Femmy Sofie Schouten, Muhamat Maariful Huda, Citra Suardi, Sasa Ani Arnomo, Helpi Nopriandi, and Ejo Imandeka. *Penyimpanan Data Terdesentralisasi Untuk Aplikasi Modern*. Padang: CV. Gita Lentera, 2025.
- Mansula, Gabriella. "Perlindungan Hukum Atas Penyelesaian Hukum Tidak Berfungsinya Proses Transaksi Melalui Smart Contract Pada Sistem Blockchain." *Al Qodiri: Jurnal Pendidikan, Sosial Dan Keagamaan* 21, no. 2 (2023): 787-802. <https://doi.org/10.53515/qodiri.2023.21.2.787-802>.
- Martinelli, Imelda, Nabilla Mahva Tsabita, Amanda Fitriani Eka Putri, and Devina Novela. "Legalitas Dan Efektivitas Penggunaan Teknologi Blockchain Terhadap Smart Contract Pada Perjanjian Bisnis Di Masa Depan." *UNES Law Review* 6, no. 4 (2024): 10761-76.

- <https://doi.org/10.31933/unesrev.v6i4.2049>.
- Mayshinta, Aura, and Indrati Rini. "Keabsahan Perjanjian Berbahasa Inggris Tanpa Terjemahan Bahasa Indonesia." *DIVERSI: Jurnal Hukum* 10, no. 2 (2024): 326–57. <https://doi.org/10.32503/diversi.v10i2.5963>.
- Peryanto, Jerry, Diana Ria W Napitupulu, and Paltiada Saragi. "Perlindungan Hukum Bagi Pengguna Cryptocurrency Menurut UU No. 4 Tahun 2023 Tentang P2SK." *Jurnal Kolaboratif Sains* 8, no. 5 (2025): 2432–46. <https://doi.org/10.56338/jks.v8i5.7576>.
- Sitorus, Rifka Lolyana Oktavia, Restu Putri Nilakandi, Aurillia Silmi Ayu Khoirunnisa, and Rayi Kharisma Najib. "Analisis Yuridis Keabsahan Smart Contract Sebagai Bentuk Perjanjian Elektronik Di Indonesia." *Jurnal Ilmiah Penelitian Mahasiswa* 3, no. 6 (2025): 394–406. <https://doi.org/10.61722/jipm.v3i6.1677>.
- Sukananda, Satria, and Wahyu Adi Mudiparwanto. "Akibat Hukum Terhadap Perjanjian Yang Mengandung Cacat Kehendak Berupa Kesesatan Atau Kekhilafan (Dwaling) Di Dalam Sistem Hukum Indonesia." *Justitia Jurnal Hukum* 4, no. 1 (2020).
- Syamsiah, Desi. "Kajian Terkait Keabsahan Perjanjian E-Commerce Bila Ditinjau Dari Pasal 1320 Kuhperdata Tentang Syarat Sah Perjanjian." *Jurnal Inovasi Penelitian* 2, no. 1 (2021): 327–32. <https://doi.org/10.47492/jip.v2i1.1443>.
- Tjandra, Ronan Steven, Veriani Nur Dewi Murni, and Bimahri Qaulan Layyina. "Deviasi Penggunaan Blockchain Dalam Praktik Kenotariatan Modern Di Indonesia." *UNES Law Review* 7, no. 4 (2025): 1349–62. <https://doi.org/10.31933/unesrev.v7i4.2460>.