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MAPPING THE BOUNDARIES OF SMART CONTRACTS IN INDONESIAN CIVIL LAW: EVIDENTIARY POSITION, PROBATIVE FORCE, AND FORMALITY LIMITS

Ferawati Natalita*
Faculty of Law, President University, Indonesia
Email: ferawati.natalita@president.ac.id

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Abstract: Smart contracts are now explicitly mentioned in Indonesian law, but the law says very little about how much they prove in a civil case. This article asks three things: what place smart contracts have in Indonesian civil evidence law, how strong they are as evidence, and which legal formalities the code cannot fulfil. The study uses normative legal research, with statutory and conceptual approaches. It looks at the Civil Code, the Electronic Information and Transactions Law as amended in 2024, the Financial Sector Development and Strengthening Law as amended in 2026, the Notary Office Law and Bank Indonesia Regulation No. 6 of 2024. A smart contract can be brought to court in three forms: its source code, its execution record and a printout. Each proves something different, so this article examines them one by one. Smart contracts are admissible as electronic evidence. Unlike an authentic deed or an acknowledged private deed, however, they have no probative force fixed by statute. How much they prove depends on whether the record can be authenticated and traced to the people behind it, and on what other evidence supports it. Its strength grows when the written terms are signed with a certified electronic signature and when the parties keep the agreement that the Financial Sector Development and Strengthening Law requires them to store. The 2024 change to Article 5(4) of the Electronic Information and Transactions Law removed the express exclusion of notarial deeds, but it did not make electronic authentic deeds possible. When the law requires a deed or a registration, a smart contract can carry out the transaction but cannot replace that deed or registration. The article recommends technical guidance for judges on checking smart-contract evidence, and clearer rules on linking code to the terms the parties agreed.

Keywords: Smart contracts; electronic evidence; authentic deed; probative force; Indonesian civil law.

* Corresponding author: Ferawati Natalita. *E-mail: ferawati.natalita@president.ac.id*

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1. Introduction

Contracting has moved from paper to electronic communication and, more recently, to automated performance. International electronic-commerce law accepted early on that a contract should not lose legal effect merely because it was concluded electronically. The United Nations Commission on International Trade Law (UNCITRAL) developed the principle of functional equivalence to decide when an electronic record can do the work of writing, a signature or an original (UNCITRAL, 1996; United Nations, 2005). In 2024, UNCITRAL went further and adopted the Model Law on Automated Contracting, which deals directly with automated systems, including smart contracts, in the formation and performance of contracts (UNCITRAL, 2024).

The smart contract is not a product of blockchain. Szabo (1997) proposed the idea more than a decade before Bitcoin appeared. His aim was to build contract terms into software and hardware so that performance would rely less on the good faith of the parties. Legal writers since then have tended to define smart contracts by one feature: automated execution (Giancaspro, 2017; Raskin, 2017). Distributed ledgers made the idea workable in practice. The legal problems, though, are much older than the technology. What did the parties actually agree? Does the code reflect it? And how can either be proven in court?

These problems become real once a dispute reaches a judge. Every smart contract leaves records behind it: the source code, the transaction logs and the ledger entries. Showing that a transfer took place is one thing. Showing that these records prove an agreement, and what its terms were, is another. Legal form has long helped with this, because it fixes the terms of a deal in a shape that a court can trust (Fuller, 1941). Indonesian law makes this link especially close. Its rules of civil procedure, the Herzien Inlandsch Reglement (HIR) and the Rechtsreglement voor de Buitengewesten (RBg), together with the Civil Code, enumerate the forms of evidence, and within written evidence the form of a document largely determines its probative force. Electronic evidence was later added to this framework by special legislation.

Indonesia is also one of the jurisdictions that now names smart contracts in statute. Under Article 44 of Law No. 4 of 2023 on Financial Sector Development and Strengthening, as amended by Law No. 4 of 2026 (the P2SK Law), parties to transactions in the capital market, the money market and the foreign exchange market, including derivative transactions, may use smart contracts, and a smart contract and its printout may serve as lawful evidence as provided in the law on electronic information and transactions. The use of a smart contract must be

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accompanied by storage of an agreement setting out at least the terms on the automated performance of rights and obligations, and further regulation is left to the financial sector authorities. Bank Indonesia Regulation No. 6 of 2024 on the Money Market and Foreign Exchange Market is one such implementing regulation. Recognition as evidence, however, does not settle probative force. Neither instrument says whether a smart-contract record can ever carry the weight of an authentic deed, how a court should treat a dispute in which the deployed code and the parties' natural-language terms diverge, or which formal requirements automation cannot replace. Article 44 is technology-neutral. Its elucidation mentions distributed ledger technology only as one possible platform among others, and smart contracts may also run on permissioned or centralized systems. This article focuses on blockchain-based smart contracts, the most common and legally most challenging form, while noting where the analysis differs for other systems.

This article takes a doctrinal approach. Based on current law, it aims to show when a smart-contract record can prove a contract under Indonesian civil law, and when the law's formal requirements stop it from replacing traditional documents. Two research questions follow from this aim: (1) what place do smart contracts and their printouts have in Indonesian civil evidence law; and (2) how strong are smart contracts as evidence compared with authentic and private deeds, and what supporting measures and formal requirements limit that strength?

The contribution of this article is not simply to repeat that electronic evidence and authentic deeds carry different evidentiary consequences. The harder question is what follows when Article 5(4) of the ITE Law is read together with Article 44 of the P2SK Law and the rules on authentic deeds. Three points emerge from that reading. Article 44(2) recognizes smart contracts as evidence only within the framework of the ITE Law, while the amended Article 5(4) leaves specific statutory formalities to other legislation. Recognition as electronic evidence therefore does not give a smart-contract record the fixed probative force of an authentic deed. Article 44(3) also requires parties to keep an agreement setting out the terms of automated performance. If the code and the agreed terms later diverge, that stored agreement becomes an important guide to interpretation, unless the parties have expressly made the code part of their contract. Finally, source code, execution records and printouts do not prove the same fact. Each plays a different evidentiary role and may need different supporting evidence. Together, these distinctions show where automation can perform a contractual function and where Indonesian law still requires a particular legal form.

The closest recent study is that of Sari, Wijayanti, Widowati and Maharati (2026), which looks at algorithmic and blockchain evidence in general and calls for civil procedure to be reformed beyond the HIR and RBg. This article stays within current law instead. It examines Article 44 of the P2SK Law and its elucidation, which that study does not cover, and compares smart contracts with the evidentiary ranking of authentic and private deeds. These questions are not only relevant to Indonesia. Other civil-law countries that recognize smart contracts in their laws and still have a notarial tradition will face them as well.

The rest of the article is organized as follows. Section 2 reviews the international and Indonesian literature. Section 3 describes the research method. Section 4 presents the findings in three parts: the evidentiary position of smart contracts, their probative force compared with authentic and private deeds, and the formal requirements that code cannot replace. Section 5 concludes.

2. Literature Review

2.1 Smart contracts and contract law

Even the term "smart contract" is debated. Vessio et al. (2024) show that people use it loosely, that there is no single agreed definition, and that the word "contract" may not belong in the term at all. Buterin (2018), whose Ethereum platform made the term popular, has even said he regrets using it. Code that moves an asset when a condition is met is not always a contract in the legal sense (Mik, 2017; Werbach & Cornell, 2017), and traditional contract law has difficulty explaining how self-executing code is formed and interpreted (Durovic & Janssen, 2018; Savelyev, 2017). Raskin (2017, p. 310) separates strong smart contracts, which are very expensive to cancel or change, from weak ones that a court can still adjust. The Law Commission of England and Wales (2021) identifies three types: natural-language contracts carried out by code, hybrid contracts, and contracts written only in code. Allen and Hunn (2022) show that software can carry out part of a contract without becoming the whole agreement. The Law Commission's classification serves here as an analytical tool. It helps to separate the forms a smart contract can take and, with them, the different things its records can prove. The Law Commission works within the common law of England and Wales, where judicial precedent plays a central role. Indonesia, by contrast, follows the civil-law tradition and has a Latin-type notarial system. For this reason, the Law Commission's conclusions on the validity and enforceability of smart contracts are not carried over into Indonesian law, which Section 4 analyzes on its own terms. These differences matter for evidence, because what a smart contract can prove depends on how much of the agreement it actually contains.

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Other studies look at remedies and disputes. Smart contracts do not make courts unnecessary. Terms written in code are still subject to contract law, and when a dispute arises, the code has to be explained again in words (Poncibò & DiMatteo, 2020, p. 119). Because performance happens automatically, disputes usually come after the contract has already been carried out, and the question then is whether that performance should be reversed (World Bank Group, 2020, p. 20).

2.2 Indonesian scholarship

Indonesian scholarship has concentrated on validity. Studies have examined the characteristics of smart contracts in e-commerce sales (Muhammad, 2019), their existence under Indonesian contract law (Parmitasari, 2022), their validity in business transactions (Abidin, 2023) and their legal certainty under civil law (Sakirman, Akib, & Umar, 2024). These studies focus mainly on whether smart contracts can fulfill the four requirements for a valid agreement as stated under Article 1320 of the Civil Code and on their status as electronic contracts. Lim, Angkasa and Wibowo (2024) add practical concerns, including coding errors and a shortage of experts.

Related literature addresses notarial practice. Nazamuddin (2024) examines the use of blockchain-secured smart contracts in cyber notary services and identifies uncertainty over the validity and evidentiary strength of such deeds as the main obstacle. Kiswah, Kumalasari and Ali (2026) argue that replacing physical presence before a notary with virtual presence risks turning the authentic deed into a legal fiction, and propose a risk-based model of presence.

The work closest to the present article is that of Sari, Wijayanti, Widowati and Maharati (2026), who examine algorithmic evidence and smart-contract disputes within the civil evidence system. They describe that system as closed and enumerative (pp. 137–140) and observe that a blockchain guarantees that records are not altered after entry, but not that their content was true when entered, so that wallet addresses still have to be linked to persons through additional proof (pp. 142–145). Their analysis is directed at reform of civil procedure and e-litigation. It does not examine Article 44 of the P2SK Law or its implementing regulations, and it does not separate the different objects of proof that a smart contract generates.

2.3 Research gap

Indonesian studies have mostly asked whether smart contracts are valid under Article 1320 of the Civil Code and whether they are admissible as electronic evidence. The closest study, Sari et al. (2026), notes that the distinction between authentic and

private deeds assumes paper documents and handwritten signatures. It does not go on to measure the probative force of smart contracts against those deeds. None of the literature reviewed for this study reads the 2024 amendment of Article 5(4) of the ITE Law together with Article 44 of the P2SK Law and its implementing regulations, or considers what the elucidation of Article 44(3) says about the relationship between the stored natural-language agreement and the code. The literature also tends to treat "the smart contract" as a single item of evidence, although the source code, the execution record and the printout prove different things. This article addresses these gaps.

3. Research Method

This article uses juridical normative research, also called doctrinal legal research. Normative legal research examines law as written norms and relies on library materials rather than field data (Soekanto & Mamudji, 2015). Marzuki (2017) describes legal research as a process of finding legal rules, legal principles and legal doctrines to answer the legal issue at hand. In his view, legal research is prescriptive: it does not only describe the law but also states what the law ought to be. This method suits the present study because its questions concern the position and evidentiary strength of smart contracts under Indonesian law. Those questions are answered by examining legal norms and how they relate to one another, not by observing practice in the field.

The study uses the statute approach and the conceptual approach (Marzuki, 2017). The statute approach is applied to two groups of legislation that play different roles. The core normative framework consists of the Civil Code, the HIR and the RBg, which set out the forms of evidence and the rules on authentic and private deeds; the ITE Law, which admits electronic evidence and electronic signatures; the P2SK Law, which recognizes smart contracts in the financial sector; and the Notary Office Law, which governs how authentic deeds are made. These instruments are used to answer both research questions. A supplementary group is used only in Section 4.3 to test where formal requirements stop automation from replacing traditional instruments: the laws on arbitration, fiduciary security, limited liability companies and stamp duty, and the regulation on land registration. Government Regulation No. 71 of 2019 and Bank Indonesia Regulation No. 6 of 2024 are used as implementing rules for the ITE Law and the P2SK Law. Full titles, amendments and official sources are listed under Legal materials. The legal framework is examined as it stood in October 2026.

The provisions are interpreted in three ways. Textual interpretation establishes what each provision says, based on the official Indonesian text and its elucidation.

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Systematic interpretation reads provisions in relation to one another, in particular Article 44 of the P2SK Law alongside Articles 5 and 6 of the ITE Law, and the amended Article 5(4) alongside the Civil Code and the Notary Office Law. Where a general rule and a special rule meet, the special rule is applied only within its own scope, so conclusions drawn from the P2SK Law are confined to the transactions it covers. Amendments are traced to establish which version of a provision is in force, and the earlier text is used where it explains the purpose of a change, as with the 2024 amendment of Article 5(4). The conceptual approach is used where legislation is silent, drawing on doctrine to clarify concepts such as written evidence, electronic evidence, attribution and formal requirements.

The secondary materials are legal books, journal articles, theses, reports and news reports on electronic and automated contracting (Soekanto & Mamudji, 2015). All materials were collected through library research (Soekanto, 1986) and analyzed qualitatively. Section 4 keeps a clear line between what the law states and what this article proposes: statements about the law rest on the provisions cited, and recommendations are identified as proposals.

4. Results and Discussion

4.1 The evidentiary position of smart contracts in Indonesian civil law

Indonesian civil procedure enumerates the forms of proof. Article 164 HIR, Article 284 RBg and Article 1866 of the Civil Code name the same five forms of evidence: written evidence, witness testimony, presumptions, admissions and oaths. Sari et al. (2026, pp. 137-140) describe this system as closed and enumerative. It fits the codes themselves, but it no longer captures the whole of Indonesian evidence law, because newer laws have added more types of evidence. It is more accurate to say that the civil codes set out a fixed list of evidence, and that the law on electronic evidence later added to it. So for any new kind of record, the first question is whether that law accepts it as evidence at all.

For electronic records, the ITE Law answered that question. Article 5(1), restated without change in Law No. 1 of 2024, provides that electronic information, electronic documents and their printouts are lawful evidence. Article 5(2) adds that they extend the types of evidence recognized in Indonesian procedural law. They add to the list in the HIR rather than replacing it. That recognition comes with conditions. Under Article 5(3), electronic information is valid if it uses an electronic system in accordance with the Law. Article 6 addresses a narrower issue. Where legislation requires information to be in written or original form, an electronic record can perform that function if it is accessible, capable of being displayed, protected in

its integrity and capable of being accounted for. The ITE Law does not expressly make these four conditions a general test for all electronic evidence. Using them as the yardstick of reliability is this article's interpretation, although it matches how officials have described the provision in practice (Hukumonline, 2016). Two stages should also be kept apart. Article 5 decides whether an electronic record is received as evidence at all, and Article 6 is then used to assess how far it can be trusted. Neither stage settles who the parties were or whether they agreed. Accountability under Article 6 means that a record can be traced to a responsible system or person. It does not mean that the identity or consent of a contracting party has been legally established.

Smart contracts entered this framework through Article 44 of the P2SK Law. Article 44(1) allows parties to transactions in the capital market, the money market and the foreign exchange market, including derivative transactions, to use smart contracts as provided in the legislation on electronic information and transactions. Its elucidation describes a smart contract as one form of electronic contract under that legislation, which may take the form of a set of agreements specified in digital form, including a computer protocol, and mentions distributed ledger technology as one possible platform among others.

Article 44(2) provides that a smart contract and/or its printout may serve as lawful evidence as provided in the law on electronic information and transactions, and its elucidation describes them as an extension of lawful evidence in accordance with the procedural law in force in Indonesia. Under Article 44(3), parties who use a smart contract must also store an agreement that at least sets out the terms for its automated performance. Article 44(4) leaves the details to the financial sector authorities. For the money and foreign exchange markets, Bank Indonesia has done this in Article 13 of Regulation No. 6 of 2024. The P2SK Law therefore confirms admissibility rather than creating a new category of evidence. Its elucidation uses the same language as Article 5(2) of the ITE Law, and Articles 5 and 6 of that Law still govern smart contracts. Indonesian scholarship reached the same position before 2023, treating smart contracts as electronic contracts under the ITE Law and its implementing regulations (Parmitasari, 2022, p. 100). The P2SK Law gives that view a statutory basis. It does not say how much weight a smart contract carries once admitted, and Sakirman et al. (2024, p. 9) identify recognition as lawful evidence in court as one of the main open issues for smart contracts in Indonesian civil law.

These provisions work at different levels, and their reach should not be confused. The ITE Law sets the general rule for every smart contract in any sector: the record is electronic information, admissible under Article 5 and assessed under Article 6. Article 44 of the P2SK Law adds sector-specific rules for capital-market, money-

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market and foreign-exchange transactions, including derivatives. Within that scope, it expressly permits smart contracts and imposes the duty to store an agreement. Article 13 of Bank Indonesia Regulation No. 6 of 2024 applies these rules to money-market and foreign-exchange products, and Article 14 adds duties on governance, system security, data access and prior consultation with Bank Indonesia. Outside these sectors, for example in e-commerce or supply contracts, there is no statutory duty to store a natural-language agreement, and the parties' position rests on the ITE Law and general contract law alone. The conclusions in this article that rely on Article 44(3) therefore apply only to the financial transactions it covers. The others apply to smart contracts generally.

That gap matters because "a smart contract" is not a single object when it reaches a court. At least three different things may be offered, and each answers a different question. It also helps to separate three facts a party may need to prove: that the other party consented, what the obligation contained, and that automated performance actually took place.

The source code shows the logic the program was written to follow. It can prove what the program would do under given conditions, so it bears on the content of the obligation, but only if the parties adopted or incorporated the code into their agreement. On its own, it says nothing about consent. Its origin and integrity are checked by showing that the code offered in court is the code that was deployed, usually by matching it against the version recorded on the system. Because the languages programmers write in are not the code a computer actually runs, this matching may require technical evidence (World Bank Group, 2020, p. 14), and the court will usually need an expert to explain what the code does (Poncibò & DiMatteo, 2020, p. 119).

On a blockchain, the execution record is the ledger entry. It records which address sent which transaction and at what time, which makes it the strongest proof that automated performance happened. Whether it can be altered later depends on how the system is built. A public blockchain stores the record across many independent nodes, so unauthorized changes are very hard to make (LabCFTC, 2018, p. 7), and each transaction can be traced and audited (Kaur, Ali, & Faisal, 2023, p. 36). A permissioned or centralized system gives only as much protection as its operator has designed into it. There are also limits to what the record shows. Events outside the system are beyond its reach (Ahmad, 2023, p. 72), and it says nothing about the person who used the key to sign. A court that wants to link an address to a party must rely on other evidence, for example customer-identification records kept by an intermediary, correspondence in which the party used the address, or witness

testimony. As for the printout, this is the document that actually reaches the judge. The ITE Law and the P2SK Law both refer to printouts, yet a printout can prove only what the original record proves, and only when it is shown to reproduce that record accurately.

Taken separately, source code, execution records and printouts do not necessarily establish the parties' agreement for the purpose of Article 1320 of the Civil Code. A blockchain transaction bearing a digital signature may indicate that a party assented to a particular action, but it does not necessarily reveal the full terms of the agreement. The same problem applies to code. Even where code is executed consistently, it may still fail to reflect what the programmer or the parties actually intended. As noted in the literature, identical code will be interpreted by computers in the same way even if the code itself does not accurately represent the intended contractual arrangement (Raskin, 2017, p. 324). This creates a continuing possibility that the legal terms agreed by the parties and their technical expression in code will not fully correspond (Poncibò & DiMatteo, 2020, p. 119).

Applying Article 6 to smart-contract records produces mixed results. Their strongest feature is usually integrity, because blockchain records are difficult to alter once recorded (Sachdeva & Ali, 2023, p. 15). However, an unaltered record is not necessarily an accurate one. If a smart contract relies on external data, such as a price or exchange rate, incorrect data can still produce an incorrect result (Sari et al., 2026, pp. 142-145; Poncibò & DiMatteo, 2020, p. 132). The main weakness is accountability. A blockchain record can show that a transaction was authorized by a particular private key, but it may not identify the person who controlled that key (Buterin, 2014). Accessibility also depends on the type of system. Public blockchains are generally easier to inspect, while permissioned systems restrict access to selected users. In either case, courts may still need technical experts to explain the records (Lim et al., 2024). On permissioned systems, identifying participants may be easier, but the reliability of the record depends more heavily on the system operator.

The answer to the first research question is therefore conditional. Under Article 44 of the P2SK Law, read with Articles 5 and 6 of the ITE Law, a smart contract is admissible in Indonesian civil proceedings as electronic evidence, as an extension of the evidence listed in Article 164 HIR and Article 1866 of the Civil Code rather than as a separate category. Admissibility, reliability and probative force are different questions. Article 5 decides admissibility. Reliability depends on which object is offered and how far it meets the conditions in Article 6. Probative force, meaning the weight the law or the judge gives the evidence, is the question taken up in Section 4.2.

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4.2 Probative force compared with authentic and private deeds

Once evidence is admitted, Indonesian law does not treat all written evidence alike. Under Article 1867 of the Civil Code, proof in writing is given by authentic or private writings. Article 1868 defines an authentic deed as one made in the form prescribed by law, by or before a public official authorized to do so in the place where it is made, and Article 1870 gives such a deed perfect proof of its contents between the parties, their heirs and their successors. A private deed under Article 1874 reaches the same force only when the person against whom it is used acknowledges it (Article 1875). If that person denies the signature, the court must order it examined (Articles 1876-1877). The Notary Office Law shows how closely this force depends on procedure. A notary must read the deed to the appearing parties in the presence of at least two witnesses, and the deed must be signed there and then (Article 16(1)(m)). The reading may be skipped if the parties wish, provided they have read and understood the deed, this is stated in the closing and every page is initialled. Even then, the heading, the identification of the parties, a short explanation of the main content and the closing must still be read (Article 16(7)-(8)). If these requirements are not met, the deed has only the force of a private deed (Article 16(9)), except for wills (Article 16(10)). The same downgrade follows from breaches of the rules on the structure of the deed, the appearing parties and the witnesses (Articles 38-41), and more generally from a defect of form, provided the parties signed the deed (Article 1869 of the Civil Code).

Losing authentic force is not the same as invalidity. If the law requires an authentic deed only as proof, a downgraded deed still counts as a private deed and the transaction remains valid. If the deed is a condition of validity, as for a gift or a fiduciary security (Section 4.3), a deed that is not authentic may leave the transaction without legal effect.

By this standard, a standalone smart-contract record cannot be an authentic deed, because all three elements of Article 1868 are missing: no public official makes or witnesses it, no law sets its form, and the parties never appear before anyone. Nor is it a typical private deed, which assumes a signed document. The closest thing to a signature on a blockchain is the digital signature on a transaction, which shows only that a certain private key approved it. Whether this counts as an electronic signature depends on the elements in Article 11 of the ITE Law, including ways to identify the signer and show their consent. Because a wallet key is not issued by an Indonesian electronic certification provider, it can at most be an uncertified electronic signature under Government Regulation No. 71 of 2019. Its reliability, including who actually controlled the key, must then be proven through other evidence.

Indonesian contracting practice already uses electronic tools that the code alone lacks. Contracts are increasingly concluded as electronic documents bearing an electronic signature and, where stamp duty applies, an electronic stamp (*meterai*). These tools do different things. A certified electronic signature links a document to an identified signer and protects its integrity, which addresses the accountability problem identified in Section 4.1. The electronic stamp is a fiscal instrument. Under Law No. 10 of 2020, it pays the stamp duty due on certain documents, including documents used as evidence in court (Article 3). A document that lacks the stamp is not made invalid, and the duty can be settled later through *pemeteraian kemudian*, a later stamping validated by an official designated by the Minister of Finance (Articles 1 and 17). The stamp is therefore a tax matter. It does not decide whether a document is admissible or how much it proves. Neither tool turns an electronic document into an authentic deed. Both, moreover, attach to the electronic document that records the parties' terms, not to the code. Therefore, how strong a smart contract is as evidence depends less on its code than on its link to such a document. If the written terms are signed with a certified electronic signature, and the code can be shown to follow those terms, the parties have a strong electronic document, and the smart contract shows that the contract was carried out. If the code stands alone, it is just one piece of evidence that the judge must weigh with everything else.

One might argue that the 2024 amendment of the ITE Law changed this. The original Article 5(4)(b) expressly excluded documents that must be made as notarial deeds or deeds made by a deed official. Law No. 1 of 2024 replaced that list with a general reservation: the recognition does not apply where another statute provides otherwise. Some commentators saw this change as a step toward electronic authentic deeds (Kompas.com, 2023). When it is read together with Article 44 of the P2SK Law, however, the amendment turns out to do less than it seems. Article 44 only says that a smart contract and its printout may be used as lawful evidence. That is a rule about admissibility. It says nothing about how much weight the evidence carries. The new Article 5(4) also sends the question back to the laws that define authentic deeds, and none of those laws have changed. Article 1868 of the Civil Code still requires a deed to be made "before" an official, and Article 16(1)(m) of the Notary Office Law still requires the deed to be read and signed in front of the parties and witnesses. The notary's power to certify electronic transactions, often called "cyber notary," appears only in the elucidation of Article 15(3) of the Notary Office Law. Such opinions see it as a starting point rather than a complete framework, and point out that Article 1868 itself would have to be amended before an electronic deed could count as authentic (Hukumonline, 2014). Kiswah et al. (2026) likewise warn that replacing physical presence with virtual presence could turn the authentic deed into a legal

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fiction. The 2024 amendment removed an explicit barrier, but it did not give smart contracts, or any other electronic record, the evidentiary strength of an authentic deed.

This limit applies to the standalone smart contract. The position is different where a notary uses automated tools within notarial procedure, for example by drawing up an authentic deed in the ordinary way and attaching a smart contract that performs its payment terms. In such a hybrid arrangement, the deed keeps its authentic force because it meets Article 1868 and the Notary Office Law, and the smart contract serves only as an instrument of performance. Whether notaries may go further and certify electronic transactions themselves depends on implementing rules for the cyber notary concept, which have not yet been issued (Kiswah et al., 2026).

The most difficult situation is when the code does something different from what the parties agreed in writing. A hypothetical case can show how the rules work. Imagine a bank and a corporate client enter into a foreign-exchange forward contract on a permissioned platform. Their stored agreement under Article 44(3) says the settlement will use Bank Indonesia's reference rate (JISDOR) published on the settlement date. The code, however, pulls the rate from another data source at a different time of day. As a result, on the settlement date it sends the bank around Rp 300 million more than the agreement allows. The client then sues to get the difference back. This case is made up for illustration and is not based on an actual court decision.

Three separate questions arise. One is what the parties agreed. If the words of an agreement are clear, the court may not depart from them by interpretation (Article 1342 of the Civil Code). If they allow more than one meaning, the court must look for what the parties actually intended rather than the literal wording (Article 1343), and in case of doubt the agreement is read against the party who stipulated the term and in favour of the party who bound itself (Article 1349). Incorporating the code into the agreement changes this picture, but it does not settle it. Code that the parties have incorporated becomes a contractual term like any other. Incorporation does not, however, decide which term prevails when the code and the natural-language terms conflict. That is a question of precedence, and it is answered by what the parties agreed and by the rules of interpretation. If the parties included a clause stating which text prevails, which freedom of contract under Article 1338 allows, the court follows it. If they did not, the court must read all the terms in relation to one another and in the light of the agreement as a whole (Article 1348), look for the parties' common intention (Article 1343) and, in case of doubt, apply Article 1349. For transactions covered by the P2SK Law, the elucidation of Article 44(3) describes the stored

agreement as a framework in natural language on which the code's automated performance rests. The elucidation of Article 44(1) adds that smart derivative contracts are meant to narrow the gap between what a contract means in law and how it actually runs. In the example, the JISDOR term applies unless the parties agreed that the code would take priority.

The next question is what happens after a payment that does not match the agreement. The code cannot cancel a transfer once it is made, so the answer has to come from the Civil Code. Money paid without being owed can be claimed back (Articles 1359 and 1360), and a party that performs differently from what was agreed may have to pay damages (Article 1243). Deciding how the contract should be read does not undo the transaction on its own. It only gives the client a claim, which still has to be enforced in court.

The last question is how the claimant proves the divergence. The statutory rule does not change: whoever asserts a right must prove it (Article 163 HIR; Article 1865 of the Civil Code). Automation changes who must start the case. Because performance has already happened, the payer becomes the claimant and must show that it should be reversed (World Bank Group, 2020, p. 20). In practice, the client must establish the agreed term, through the stored agreement and any signed contract documents; the behaviour of the code, through the source code and the execution record, explained by an expert whom the court may appoint on its own motion or at a party's request (Article 154 HIR; Article 181 RBg); and the amount of the divergence, by comparing the payment made with the payment the agreed term would have produced. Much of this evidence is often held by the other party or the platform operator, which is why the existence and integrity of the stored agreement matter so much.

Article 44(3) requires the agreement to be stored, but it does not say in what form or how its authenticity is secured. A stored file proves that a text existed. It does not, by itself, prove that both parties approved that particular version. This article therefore proposes, as an additional safeguard beyond the current law, that the stored agreement be signed with a certified electronic signature. Under Article 11 of the ITE Law and Government Regulation No. 71 of 2019, a certified signature identifies the signer and reveals any later change to the signed document, which is exactly what a court needs when the code and the agreement point in different directions.

Indonesian law thus assigns a fixed probative force to authentic deeds and, once acknowledged, to private deeds. Neither Article 5 of the ITE Law nor Article 44 of the P2SK Law gives a standalone smart-contract record a comparable fixed force, and the 2024 amendment of Article 5(4) does not change this. The weight of such a

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record is left to the judge. It depends on how well the record is authenticated, how reliably it is linked to identifiable parties and what other evidence supports it.

4.3 Formality as the boundary of substitution

Comparing smart contracts with deeds shows that their limits come less from technology than from legal form. Indonesian contract law begins with consensualism. Article 1320 of the Civil Code sets four conditions for a valid agreement, and none of them is about form. Article 1338 then says that agreements made lawfully bind the parties like law. So for the many contracts that need only consent, a smart contract can record and carry out the agreement, subject to the evidence issues discussed above. The limit appears where a statute asks for more. These extra requirements have different purposes. Failing to meet them can affect whether the contract is valid, how it can be proven, whether a right is created, or whether it binds third parties. Each one draws a different line on what a smart contract can replace. The first group is writing and signature requirements. Under Article 1851 of the Civil Code, a settlement agreement is valid only if it is in writing, so here writing is a condition of validity.

Arbitration needs more care, because Law No. 30 of 1999 treats two situations differently. An agreement to arbitrate future disputes must be contained in a document signed by the parties, although an exchange of letters, telex, facsimile, e-mail or other communications suffices if it comes with a record of receipt (Article 4(2)-(3)). An agreement made after a dispute has arisen is stricter. It must be a written agreement signed by the parties, or a notarial deed if they cannot sign (Article 9(1)-(2)), and it is void if it omits the matters listed in Article 9(3), such as the subject of the dispute and the identity of the parties and arbitrators (Article 9(4)). Requirements of this kind are what functional equivalence was designed to meet. Article 6 of the ITE Law treats electronic information as satisfying a writing requirement if it meets its four conditions, and Article 11 gives qualifying electronic signatures legal force. A smart contract linked to a readable electronic document signed by the parties can therefore satisfy Article 1851 or Article 4 of the Arbitration Law. Code alone, signed only with pseudonymous keys, is unlikely to do so, because it may not show the agreed terms in readable form or identify the signatories. For a submission agreement under Article 9, a smart contract is of little use, since that agreement must be drafted for the specific dispute.

Some formal requirements govern proof rather than validity. Under Article 1878 of the Civil Code, a unilateral private undertaking to pay a sum of money must be written entirely in the hand of the signer or bear a handwritten statement of the

amount owed. If it does not, and the obligation is denied, the deed is admitted only as the beginning of written proof. The rule does not apply to obligations incurred by a debtor in conducting a business (Article 1878(3)), which would cover many transactions in the financial sector. It illustrates nonetheless how form can affect probative force without affecting validity, and why the probative force of a smart-contract record cannot be read from the P2SK Law alone.

Other requirements make an authentic deed a condition of validity. A gift is void unless made by notarial deed, apart from the manual gift of tangible movables (Articles 1682 and 1687 of the Civil Code). A fiduciary security must be created by a notarial deed in Indonesian (Article 5(1) of Law No. 42 of 1999). An ordinary limited liability company must be established by a notarial deed drawn up in Indonesian (Article 7(1) of Law No. 40 of 2007), although companies meeting the micro and small enterprise criteria may now be established by a statement of establishment (Article 153A et seq., inserted by the Job Creation Law, now Law No. 6 of 2023). Here a missing or defective deed does more than weaken proof: the gift, the security or the company does not come into being as intended. The reservation in Article 5(4) of the ITE Law applies directly. A smart contract can release a payment once the deed is executed, or record that it was, but it cannot replace the deed (World Bank Group, 2020, p. 14).

Registration requirements set the last boundary. A fiduciary security must be registered, and it comes into existence only on the date it is recorded in the Fiduciary Register (Articles 11(1) and 14(3) of Law No. 42 of 1999), so registration here creates the right. Transfers of land rights can be registered only on the basis of a deed made by a land deed official (Article 37(1) of Government Regulation No. 24 of 1997), and the resulting certificate serves as strong evidence of the right (Article 32(1)). In this case, registration gives the transfer its public effect and its strongest proof. In both cases the legal effect depends on an entry in a register kept by the state. A distributed ledger, however tamper-resistant, is not that register, and a smart contract cannot produce the effects the law attaches to registration.

These categories show that the real boundary is not automation itself, but the legal function that a particular form is required to perform. Where Indonesian law requires only consent and imposes no specific statutory form, smart-contract technology may be used to record or automate performance of the parties' agreement. Where writing or signature is required, electronic means may satisfy that requirement if the conditions of the ITE Law and any applicable special legislation are met. The position changes where the law requires an authentic deed, the participation of a public official, or an entry in a public register. In those cases, automation may assist

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or execute part of the transaction, but it cannot replace the legally prescribed act that gives the transaction its required legal effect.

5. Conclusions

Smart contracts are admissible as electronic evidence in Indonesian civil cases, but being admissible does not give them weight. Article 44(2) of the P2SK Law admits them only through the ITE Law, and the amended Article 5(4) of the ITE Law leaves questions about deeds to the Civil Code and the Notary Office Law. Neither law gives smart contracts a fixed probative force, so the judge decides their weight. That weight depends on what is presented. Source code can show the terms if the parties made it part of their contract, the execution record shows that performance happened, and a printout proves only what the record proves. None of them proves consent or identity without other evidence.

A smart contract cannot be an authentic deed, because no public official makes it in a prescribed form. Linked to a signed electronic document, it can meet writing and signature requirements. It cannot, however, replace an authentic deed required for validity, or a public registration required for a right to exist or to bind third parties.

On divergence between code and agreement, Article 44(3) and its elucidation treat the stored natural-language agreement as the basis and the code as its implementation, within the scope of the P2SK Law. Incorporating code into the contract makes it a contractual term, but it does not by itself give the code priority over conflicting natural-language terms. Which term prevails depends on the parties' agreement, including any precedence clause, and on the rules of interpretation in Articles 1343, 1348 and 1349 of the Civil Code. A payment that departs from the agreed terms does not reverse itself. It gives rise to a claim for the return of an undue payment or for damages, which the payer must prove in court.

Several practical steps follow from these findings. Since the weight of smart-contract evidence is left to the judge, the Supreme Court could give technical guidance on how execution records should be presented, how their integrity can be checked, and how keys or accounts can be linked to real people. Article 44(3) requires the agreement to be stored but says nothing about authenticating it, so the financial sector authorities could also require the stored agreement to be signed with a certified electronic signature. As for electronic authentic deeds, the authentic deed rests on Article 1868 of the Civil Code and the Notary Office Law, so any move in that direction should come through amendments to those laws rather than a broad reading of the ITE Law. Further research could look at how Indonesian courts actually assess

smart- contract evidence, and at how other civil-law systems with a notarial tradition have handled the same questions.

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