

The Urgency of Civil Law Reform in Responding to the Development of Artificial Intelligence in Automatic Contracts

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Abstract: *The rapid development of Artificial Intelligence (AI) technology has led to the emergence of smart contracts that revolutionize conventional contract law practices. However, Indonesia's civil law system, which still relies on the Civil Code (KUHPer), has yet to accommodate digital entities or address the validity of AI-generated contracts. Furthermore, there is no clear regulation regarding legal liability for errors or damages caused by AI in the implementation of automated contracts. This research aims to analyze the urgency of Indonesian civil law reform in addressing the rise of AI-based contracts and to provide normative recommendations for developing technology-adaptive laws. This study uses a normative juridical method with statutory, conceptual, and comparative legal approaches, examining regulations in Indonesia and other jurisdictions such as the European Union and Singapore. The study finds that Indonesia's current Civil Code is inadequate to address the complexities of smart contracts, particularly regarding the legal status of AI as a non-human actor, the validity of automated agreements, and liability for AI-driven decisions. The discussion emphasizes the importance of legally recognizing smart contracts and reformulating civil law norms to include digital legal subjects, clear validation mechanisms for AI-generated contracts, and the principles of prudence and accountability. In conclusion, reforming civil law is a strategic necessity to ensure legal certainty, uphold justice, and support the sustainable development of Indonesia's digital economy.*

Keywords: *Civil Law; Artificial Intelligence; Automatic Contracts*

INTRODUCTION

The development of global technology marked by the presence of the Industrial Revolution 4.0 has brought significant transformations in various aspects of human life, including in the economic, legal and business systems¹. This revolution is underpinned by the digitization and integration

of advanced technologies such as the Internet of Things (IoT), big data, blockchain, and especially Artificial Intelligence (AI)². AI is now not only used in the manufacturing and service sectors, but has also penetrated the legal and business sectors as a tool for complex decision-making³. One notable innovation that has emerged is the use of AI in the creation and

¹ Ricardo Francisco Reier Forradellas and Luis Miguel Garay Gallastegui, "Digital Transformation and Artificial Intelligence Applied to Business: Legal Regulations, Economic Impact and Perspective," *Laws* 10, no. 3 (August 27, 2021): 70, <https://doi.org/10.3390/laws10030070>.

² Alain Aoun et al., "A Review of Industry 4.0 Characteristics and Challenges, with Potential Improvements Using Blockchain Technology,"

Computers & Industrial Engineering 162 (December 2021): 107746, <https://doi.org/10.1016/j.cie.2021.107746>.

³ Simon Kaggwa et al., "AI in Decision Making: Transforming Business Strategies," *International Journal of Research and Scientific Innovation* X, no. XII (2024): 423–44, <https://doi.org/10.51244/IJRSI.2023.1012032>.

execution of smart contracts⁴. This technology allows contracts to be digitally created, automatically executed, and monitored without human intervention, by utilizing blockchain algorithms and networks. This phenomenon poses new challenges for the legal system, especially in ensuring the validity, fairness, and legal responsibility of transactions conducted automatically by digital entities.

The development of AI technology has led to a paradigm shift in contract practice, moving from conventional systems involving human interactions to digital-based automated contract mechanisms. In traditional contract systems, the process ranging from negotiation, drafting, to the fulfillment of rights and obligations is governed entirely by the will and agreement of human legal subjects. In contrast, automated contracts, particularly those operating on blockchain technology, are increasingly managed by algorithms and AI systems. These systems are capable of identifying parties' needs, conducting automated negotiations based on historical data and preferences, drafting real-time contracts, and executing terms based on pre-programmed logic all with minimal human intervention. While this transformation enhances efficiency and transactional speed, it simultaneously introduces significant legal challenges, especially in the areas of legal certainty and accountability. A central concern arises when an automated contract fails due to system errors or when AI actions deviate from the parties' original intent raising the legal question: who should be held responsible? Is it the algorithm developer, the end-user, or could it be the AI system itself? In a legal framework that

currently recognizes only natural persons and legal entities, the lack of recognition for AI as a legal actor results in a normative gap that risks undermining justice and legal protection in digital contractual relationships. Therefore, this shift demands urgent adaptation of civil law to address the complexities of increasingly autonomous legal interactions in the digital age.

Indonesia's civil law system until now still relies on the Civil Code (KUHPer) which is a legacy from the Dutch colonial era through the *Burgerlijk Wetboek* (BW)⁵. Although KUHPer has been the basis for regulating civil relations for more than a century, the substance of the norms contained therein has not been able to answer the dynamics of modern society, especially in the context of the development of digital technology. KUHPer does not recognize the existence of digital entities such as AI as subjects or legal actors, thus creating a legal vacuum in regulating legal relations between humans and technology-based entities. This becomes problematic when AI begins to take an active role in the automated creation and execution of contracts, while the positive legal framework does not yet provide a normative basis for assessing the legitimacy of the actions taken by such non-human systems.

Furthermore, the KUHPer also does not provide for the autonomy of AI-based contracts⁶, decision-making algorithms, as well as responsibility for digital technical errors. In automated contracts executed by AI, various decisions are taken autonomously by the system based on specific data and programming commands⁷. However, conventional civil law still relies on the principle of free will and the agreement of the parties as the basis for contract

⁴ Shafaq Naheed Khan et al., "Blockchain Smart Contracts: Applications, Challenges, and Future Trends," *Peer-to-Peer Networking and Applications* 14, no. 5 (September 2021): 2901–25, <https://doi.org/10.1007/s12083-021-01127-0>.

⁵ Agus Riyanto, *Pengantar Hukum Indonesia* (CV. Gita Lentera, 2023).

⁶ Uria Bernandus Anovanko, Andika Wijaya, and Satriya Nugraha, "Implikasi Hukum Perdata

Terhadap Penggunaan Kecerdasan Buatan (AI) Dalam Kontrak Komersial," *Innovative: Journal Of Social Science Research* 5, no. 2 (2025): 3637–53, <https://doi.org/10.31004/innovative.v5i2.18718>.

⁷ Desen Kirli et al., "Smart Contracts in Energy Systems: A Systematic Review of Fundamental Approaches and Implementations," *Renewable and Sustainable Energy Reviews* 158 (April 2022): 112013, <https://doi.org/10.1016/j.rser.2021.112013>.

validity. This mismatch creates confusion, especially when there is a system failure or loss arising from AI decisions that are not in accordance with human will. The absence of norms governing such relationships opens a gap of legal uncertainty and potentially reduces public confidence in the use of technology in legal transactions. Therefore, civil law reform is an urgent need so that the national legal system can be adaptive to the fast-growing and complex digital reality.

Seeing the complexity of the legal challenges posed by the integration of Artificial Intelligence in contract practice, the renewal of civil law in Indonesia is a necessity. The law must not lag behind the times, especially in the face of digital disruption that is systemic and cross-sectoral. The KUHP as the basis of civil law that is more than a century old is no longer adequate to answer contemporary legal problems involving smart technology. Therefore, a new legal framework that is more adaptive, responsive, and technology-based is needed, which not only regulates the substantial aspects of traditional contracts, but also anticipates the existence and role of AI in the agreement process and other civil law relationships. Other countries have been more progressive in addressing this. The European Union, for example, through the EU Artificial Intelligence Act, has designed an AI risk classification system and established legal responsibility for the use of such technology in various sectors, including in civil relations⁸. Singapore has also developed ethical guidelines and an AI regulatory framework to ensure accountability and fairness in human-machine interactions⁹. These measures show that private law regulation must continue to evolve to keep pace with technological advances, not only to protect the rights of individuals, but also to create legal certainty in the digital environment.

Indonesia needs to emulate this approach by drafting civil regulations that are inclusive of smart technology, so as not to be left behind and still be able to guarantee justice in the era of contractual digitalization.

Despite the growing body of international literature on the legal implications of AI in contractual settings, studies in the Indonesian context remain limited. Most existing research tends to focus on the technical or ethical aspects of AI, with minimal attention given to the normative legal frameworks that should govern automated contracts. To date, there has been no comprehensive study in Indonesia that normatively analyzes the legal implications of AI-generated contracts within the civil law system, particularly regarding the status of AI as a non-human legal subject and the reformulation of contract principles. This gap highlights the need for scholarly inquiry that specifically addresses how Indonesia's civil law must evolve to accommodate the complexities of smart contracts and AI-driven transactions.

Based on the above description, this article aims to show the urgency of civil law reform in Indonesia in responding to the rapid digital transformation, especially in the context of the application of AI in the creation and implementation of automated contracts. The existence of AI-based contracts has fundamentally changed the pattern of legal relations between legal subjects, thus demanding a legal system that is not only normatively adaptive, but also visionary in anticipating various possible technological developments in the future. Through this study, the author would like to provide preliminary recommendations regarding the direction of civil law development that is responsive to digital technology, including the need for

⁸ Philipp Hacker, "The European AI Liability Directives – Critique of a Half-Hearted Approach and Lessons for the Future," *Computer Law & Security Review* 51 (November 2023): 105871, <https://doi.org/10.1016/j.clsr.2023.105871>.

⁹ Araz Taeihagh, "Governance of Artificial Intelligence," *Policy and Society* 40, no. 2 (April 3, 2021): 137–57, <https://doi.org/10.1080/14494035.2021.1928377>.

recognition of non-human entities in the scheme of legal responsibility, regulation of contractual algorithms, and legal protection of the parties involved in automated contracts. It is hoped that this article can be an initial contribution to the discourse on civil law reform in Indonesia in order to remain relevant in facing the challenges of the digital era.

METHOD

This research uses the normative juridical method, which is a legal research approach that focuses on analyzing applicable positive legal norms, including legislation, legal doctrines, and relevant legal principles. This method is appropriate because the issues examined relate to normative gaps and the need for civil law reform in response to the development of AI technology, particularly in the practice of automated contracts.

The research employs three approaches: (1) a statutory approach, to examine the limitations of Indonesia's Civil Code (KUHP) in accommodating digital entities and AI-based contracts; (2) a conceptual approach, to analyze the definition and legal status of contracts, legal subjects, and liability in the digital context; and (3) a comparative law approach, by reviewing AI-related regulations in the European Union and Singapore. These jurisdictions were chosen because they represent two different but progressive legal systems that have made concrete advancements in regulating AI. The European Union has introduced the EU Artificial Intelligence Act, which establishes a comprehensive legal framework for AI risk classification and accountability. Singapore, on the other hand, has issued a practical and business-oriented AI Governance Framework, which serves as a model for balancing innovation and legal responsibility in AI deployment.

The data used in this study consist of primary legal materials (laws and regulations in Indonesia and comparative countries), secondary legal materials (academic literature,

journal articles, and prior research), and tertiary legal materials (legal dictionaries and technical references related to AI and smart contracts). Through this multi-approach analysis, the research aims to build a normative foundation for the urgency and direction of civil law reform in the digital era.

RESULTS AND DISCUSSION

Incompatibility of the KUHP with AI-Based Contracts

The results show that the Indonesian Civil Code (KUHP) has not accommodated technological developments in the realm of contract law, particularly regarding the existence of AI as an entity capable of creating and executing automated contracts. The KUHP normatively recognizes only two types of legal subjects, namely humans (*natuurlijke persoon*) and legal entities (*rechtspersoon*). In this normative structure, only these subjects are recognized as having the will, responsibility and legal capacity to make agreements. Meanwhile, AI-run smart contracts are autonomous and work based on algorithms, without direct human intervention at any stage. This raises a fundamental issue because there is no explicit provision in the KUHP that can be used as a basis for assessing the validity of contracts made or executed by AI systems.

Juridically, contracts in civil law are based on the principle of consensualism and the principle of free will between the parties¹⁰. This means that a contract is valid if there is an agreement of will between two legal subjects who are aware and legally capable. However, this principle becomes problematic when applied to smart contracts generated by AI. Algorithms do not have a will in the legal sense and cannot be held liable in the conventional sense. Although technically the contract can be automated and effective, legally there is still a gap between the technological and normative aspects. This mismatch has an impact on legal certainty, as there is no guarantee that the automated contract is recognized as valid and binding by the national legal system. In

¹⁰ Fazlul Syafriadi, "Analisis Sistem Penyusunan Kontrak Menggunakan Asas Kebebasan Berkontrak Dalam Hukum Perdata," *AL-DALIL: Jurnal Ilmu*

Sosial, Politik, Dan Hukum 2, no. 3 (November 27, 2024): 17–24, <https://doi.org/10.58707/aldalil.v2i3.879>.

addition, this lack of clarity also impacts legal protection for the parties, especially when contract execution errors occur or disputes arise involving AI decisions. Therefore, the absence of adequate legal rules in the KUHPer related to digital entities and automated systems needs to be responded to immediately through regulatory updates so that the Indonesian legal system is able to accommodate digital transformation fairly and effectively.

Lack of Liability Arrangements for AI Decisions

The results of the study show that until now, civil law regulations in Indonesia have not clearly regulated legal liability for errors or losses caused by the actions of AI, especially in the context of automated contracts. When a smart contract executed by AI fails or results in losses, the legal system has not provided a clear mechanism regarding who should bear the legal responsibility. This legal vacuum creates uncertainty and potentially serious conflicts of law.

In the juridical discourse, a fundamental dilemma arises regarding the determination of the party responsible for the consequences of AI actions. Should liability fall on the users or owners of AI systems, who directly utilize the technology? Or should it rest on the algorithm creators or AI developers, who design the decision-making logic of the system? Or should AI itself be considered a liable party? However, the Indonesian legal system, like most civil law systems, does not recognize AI as a legal subject capable of assuming legal responsibility independently.

To address this, two main liability models have been discussed in global legal discourse: strict liability and vicarious liability. Strict liability holds a party legally responsible for damage or harm regardless of fault or intent. This model is often applied in cases involving inherently dangerous activities or high-risk

technologies. In the context of AI, this approach could assign liability to AI owners or deployers, ensuring that victims of system failures are protected even when no negligence can be proven¹¹. This model promotes precaution and risk allocation but requires statutory support to be applied in practice¹².

Meanwhile, vicarious liability refers to the assignment of responsibility to a party for the actions of another, typically in employer-employee or principal-agent relationships. Applied to AI, this model would analogize AI systems as "agents" whose actions are attributed to the "principal" (the developer, deployer, or operator). In Indonesia, this principle finds a basis in Article 1367 of the Civil Code (KUHPer), which recognizes the liability of a person for damage caused by those under their responsibility—including subordinates and tools. Although AI is not currently considered a legal agent or subordinate, a legal reinterpretation of this provision could serve as a starting point for attributing AI-related liability.

In the Indonesian context, these models are highly relevant. The strict liability approach could be considered in the future for high-risk AI implementations particularly in financial, health, or autonomous systems through sectoral regulations or specific provisions in a revised civil code. Meanwhile, vicarious liability is more immediately adaptable by expanding the interpretation of "person or tool" in existing laws. Both approaches offer normative pathways to protect parties from harm and promote accountability in AI deployment. Therefore, regulatory updates should not only define legal responsibility for AI actions but also clarify the applicable liability model. This would provide legal certainty for all parties involved and foster public trust in the adoption of AI technology in contract execution and other civil domains.

¹¹ Karolina Ziemianin, "Civil Legal Personality of Artificial Intelligence. Future or Utopia?," *Internet Policy Review* 10, no. 2 (April 7, 2021), <https://doi.org/10.14763/2021.2.1544>.

¹² Franz Werro and Erdem Büyüksagis, "The Bounds between Negligence and Strict Liability," in *Comparative Tort Law*, ed. Mauro Bussani and Anthony J. Sebok (Edward Elgar Publishing, 2021), <https://doi.org/10.4337/9781789905984.00017>.

The Urgency of Legal Recognition of Smart Contracts

The analysis reveals that until now, smart contracts do not have a clear and firm legal status in the Indonesian civil law system. Although this technology is increasingly being adopted in business practices and digital transactions, the unclear legal status of smart contracts causes a regulatory vacuum that may hinder the growth of a secure and trusted digital economy. Smart contracts operate automatically through algorithms and blockchain, offering efficiency and security, yet still face significant legal uncertainty regarding their formal recognition as valid and binding instruments. To address this, it is essential to examine how other countries have legally recognized or managed smart contracts. The following table summarizes the legal and policy approaches of the European Union and Singapore:

Table 1. Comparison of EU and Singapore Legal and Policy Approaches

Jurisdiction	Legal Framework	Key Features	Relevance to Indonesia
European Union	EU Artificial Intelligence Act (Draft), Digital Services Act	Classifies AI risks, emphasizes transparency, human oversight, and accountability in automated systems	Provides a structured legal foundation suitable for high-risk sectors including finance and legal tech
Singapore	Model AI Governance Framework, Personal Data Protection	Promotes responsible AI, sector-specific guidelines, emphasizes explainability and	Practical for adoption in emerging markets and

	Act (PDPA)	accountability	private-sector innovation
Indonesia (current)	No specific regulation on AI or smart contracts in civil law (KUHPer still applies)	Lacks legal status for AI systems or contracts generated by non-human agents	Requires reform to support digital economic growth and business certainty

This comparison shows that both the EU and Singapore have proactively built regulatory frameworks that anticipate the integration of AI in legal and commercial domains. Indonesia, by contrast, still adheres to conventional legal concepts under the Civil Code (KUHPer), which do not accommodate the autonomous and algorithmic nature of smart contracts. Without legal certainty and formal recognition, businesses operating in digital platforms such as fintech, supply chain platforms, or e-commerce ecosystems face potential legal ambiguity in enforcing or disputing automated agreements.

Given the rise of digital economic actors in Indonesia and the government's commitment to digital transformation through policies like Making Indonesia 4.0 and the Digital Indonesia Vision 2045, the recognition of smart contracts in civil law is not just a technical necessity but a strategic step. Legal clarity will support innovation, attract investment in the legal tech sector, and protect businesses and consumers in an increasingly automated transactional environment. Therefore, explicit legal recognition of smart contracts beyond the traditional requirements of written consent and human agency is essential. It must consider the technological attributes of blockchain and AI, including automated execution, algorithmic logic, and immutability of data. This reform will provide a solid normative basis for the advancement of Indonesia's digital economy and its integration into the global tech ecosystem.

The Need for Norm Reformulation and Civil Law Renewal

The results indicate that the Indonesian Civil Code (KUHPer) has not undergone an adequate modernization process to adapt to digital dynamics and the development of AI technology in the practice of contract law. KUHPer is still based on an anthropocentric concept of law, where only humans and legal entities are recognized as legal subjects with rights and obligations. This is increasingly outdated in light of the growing adoption of automated contracts and AI-managed systems across digital business ecosystems. As a result, the KUHPer is unable to address new legal challenges that arise ranging from the validity of contracts generated by non-human agents to the issue of liability for decisions made by algorithms.

In this context, it is essential to initiate not only the drafting of special regulations, but also to consider the recodification of civil law as a whole to ensure its responsiveness to the digital era. One promising legal innovation is the conceptualization of digital legal entities or electronic legal agents non-human autonomous systems (such as AI) that are given limited legal recognition to act within a specific contractual or transactional scope. This concept, although still debated globally, has been introduced in academic and policy discussions in the European Union, particularly in proposals to recognize AI systems as electronic persons with specific legal duties and obligations. In Indonesia, this could be adapted in the form of a new category of semi-autonomous digital actors, whose responsibilities are legally traceable and whose authority is limited by design and registration.

Such a reform would allow AI systems involved in automated contracting to be embedded within a hybrid legal structure, where the AI operates as a delegated agent under human supervision but is recognized as having certain legal capacities for executing predefined tasks. This would bridge the gap between current legal subject doctrine and the functional autonomy of smart systems in real-world applications. Legal status could be conditional, requiring technical certifications,

traceability, and a responsible supervising entity thus aligning innovation with legal safeguards.

In addition, reformulation of civil norms should also address the validation of contracts executed by algorithms, incorporating principles such as transparency, explainability, and traceable decision-making logic. These are essential for establishing accountability and fairness in digital agreements. The principle of prudence (*voorzichtigheidsbeginsel*) and accountability should be integrated into future AI-use provisions, to prevent abuse and ensure proportional responsibility. Therefore, reforming civil law to recognize digital agents and update the legal doctrine of subjectivity and contract formation is not merely a technical improvement but a paradigm shift. It is a necessary step to ensure that the legal system evolves in tandem with technological advancements, providing legitimacy, protection, and predictability in increasingly automated civil interactions.

CONCLUSIONS

The development of AI in automated contracting practices has presented a major challenge to Indonesia's civil law system, which is still based on the colonial-era Civil Code (KUHPer). The KUHPer currently does not accommodate the existence of digital entities as legal subjects nor the validity of contracts generated and executed by AI. In addition, there is no clear regulation regarding legal responsibility for AI decisions and actions, resulting in legal uncertainty that can harm the parties involved in automated contracts. Therefore, the urgency of civil law reform is very high, both in the form of drafting additional regulations and recodification of laws that are more adaptive and responsive to the development of digital technology. Legal recognition of smart contracts as well as the establishment of new norms governing digital legal subjects, the validity of automated contracts, and the precautionary principle in the use of AI are strategic steps that need to be realized immediately. These reforms not only serve the interests of legal certainty and justice

but also provide critical guidance for policymakers in designing future-oriented legal frameworks that balance innovation, accountability, and protection in digital economic ecosystems.

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