Fakultas Hukum Universitas Riau, Jalan Pattimura Nomor 9 Gobah, Kel. Cinta Raja, Kec. Sail, Pekanbaru, Riau, Kode Pos 28127. Telp: (+62761)-22539, Fax : (+62761)-21695
E-mail: melayunesialaw@lecturer.unri.ac.id
Website: https://myl.ejournal.unri.ac.id

# The Transformation of Contract Law in the Era of Digital Contracts in Indonesia

Aulia Fikrina[a], Meissy Putri Deswari[b], Yossiramah Sucia[c], Amanda Silvia Putri[d]
[a] Program Studi Hukum Bisnis, Universitas Adzkia, Indonesia, Email: auliafikrina@adzkia.ac.id
[b] Program Studi Hukum Bisnis, Universitas Adzkia, Indonesia, Email: meissyputrideswari@adzkia.ac.id
[c] Program Studi Hukum Bisnis, Universitas Adzkia, Indonesia, Email: yossiramahsucia@adzkia.ac.id
[d] Program Studi Hukum Bisnis, Universitas Adzkia, Indonesia, Email: amandasilviaputri36@gmail.com

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**Abstract**

This study explores the transformation of contract law in Indonesia amidst the growing prevalence of digital agreements and automated contracts, particularly smart contracts. The primary issue addressed is how conventional legal paradigms can adapt to the realities of digital interaction, where agreements are often formed without direct human negotiation and executed through code. The research employs a normative-qualitative method with a comparative conceptual approach to analyze key challenges and legal gaps in the recognition, validity, and enforcement of digital contracts. The study finds that although the legal system has acknowledged digital contracts to some extent, existing doctrines remain rooted in traditional principles that are insufficient for regulating autonomous contract execution and digital evidentiary mechanisms. The novelty of this study lies in its proposal for a paradigm shift: contract law must not only accommodate digital formats but also reinterpret foundational principles such as consent, freedom of contract, and legal certainty in light of algorithmic processes. This requires a reorientation of legal thinking, where technology is no longer seen merely as a medium, but as an active actor influencing legal relationships. The impact of this research is its contribution to the theoretical and regulatory development of digital contract law, providing a critical framework for policymakers, legal scholars, and practitioners to build a responsive and equitable legal infrastructure in the digital age.

## INTRODUCTION

The rapid advancement of digital technology has had a profound impact on social, economic, and legal dimensions of modern life. One of the most significantly affected areas is contract law, where the form, execution, and evidentiary mechanisms of agreements have increasingly involved complex digital systems. In 2020, the Tokopedia data breach became a focal point of public scrutiny after millions of user records were illicitly traded on the digital black market. [1]

[1] Naufal, R. A. (2020). Tanggung Jawab PT Tokopedia dalam Kasus Kebocoran Data Pribadi Pengguna.

This incident underscored critical legal questions regarding the validity of digital consent and the scope of liability borne by platform providers within the framework of electronic contracts. A legal assessment indicates that, under the Electronic Information and Transactions Law (UU ITE) and Government Regulation No. 71 of 2019 on the Implementation of Electronic Systems and Transactions, platform providers are legally mandated to safeguard user data as an integral component of their service agreement clauses. Although no judicial ruling has explicitly examined Tokopedia's digital contract provisions, the National Consumer Protection Agency (BPKN) has opined that platforms bear contractual liability in the event of data breaches.

Another example is the GoPay automated smart contract payments that operate without user intervention, posing liability questions.[2] A separate case involved users who sustained losses due to a malfunction in GoPay's automated payment system, which operates on a smart contract framework.[3] While the dispute was resolved through alternative dispute resolution mechanisms, legal analysis reveals that GoPay's standard contractual terms fail to establish a clear compensation mechanism. Pursuant to Article 18 of the Consumer Protection Law, any contractual clause within a digital contract that disadvantages consumers may be deemed null and void by operation of law.[4]

Judicial precedents in Indonesia concerning digital contracts remain limited. Nevertheless, the Supreme Court Decision No. 447 K/Pdt.Sus/2022 explicitly addressed the admissibility of electronic evidence including digital contracts as valid proof in online business disputes.[5] This ruling affirms that digital documents may possess the same legal force as physical documents, provided that the requirements for authentication are duly satisfied.

Traditional oral or written contracts have now evolved into smart contracts agreements executed automatically through blockchain technology without the need for human intervention once agreed upon. This transformation raises a fundamental question: to what extent can Indonesia's legal system accommodate this new form of contracting without compromising the principles of justice and legal certainty?[6]

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[2] Azizah, W. (2024). *Penggunaan Platform Pembayaran Digital Oleh Generasi Z di Yogyakarta: Analisis Pengalaman dan Peran Literasi Keuangan Syariah* (Doctoral dissertation, Universitas Islam Indonesia).
[3] Saranya, A., & Naresh, R. (2024). Block chain-based trusted smart contract for secure mobile user payment gateway in e-health systems. *Soft Computing*, *28*(17), 10139-10151.
[4] Dumitru, O. I., & Tomescu, A. V. (2020). European consumer law in the digital single market. *Juridical Trib.*, *10*, 222.
[5] Putusan Mahkamah Agung (MA) Nomor 447 K/Pdt.Sus/2022
[6] M. Hildebrandt, "Law as Computation in the Era of Artificial Legal Intelligence," *Ratio Juris* 33, no. 3 (2020): 1–21.

In practice, the use of digital contracts in Indonesia, particularly in e-commerce and decentralized finance (DeFi) transactions, has been growing rapidly. According to data from Bank Indonesia, the value of digital transactions in 2023 exceeded IDR 400 trillion, with a significant portion driven by automated transaction systems.[7] However, the existing legal framework for contract law remains outdated and has not adequately responded to this development. For instance, there is no explicit regulation addressing legal liability for bugs in smart contracts or mechanisms for terminating automated contracts. This reveals a clear gap between *das Sein* (the reality of digital contract use) and *das Sollen* (the positive legal norms currently in force).[8]

Several studies have attempted to address this issue. Highlights that although blockchain technology offers efficiency and transparency, its use in contractual relationships presents challenges in terms of jurisdiction and legal accountability.[9] Emphasize the need for consumer protection in digital contracts, which are often executed without face to face interaction.[10] Examine the applicability of smart contracts under Indonesian civil law and find that the current legal system still relies heavily on classical contract doctrines, which do not reflect the realities of digitalization.[11] Another study proposes dispute resolution through technological arbitration forums, though these mechanisms have not yet been formally regulated.[12] Argues for the necessity of contract code audits to prevent technical abuse of smart contracts.[13] However, none of these studies has comprehensively proposed a reformulation of the contract law paradigm that structurally and substantively addresses the digital transformation beyond merely adding technical provisions. The state of the art in digital contract research (2020–2025) demonstrates that while Afrilhani & Dwijayanthi (2024) examine the enforceability of smart contracts under Indonesian contract law.[14] Johan (2025) highlights jurisdictional challenges of blockchain-

[7] Bank Indonesia, *Statistik Sistem Pembayaran dan Uang Elektronik*, 2023.
[8] A. Susanto, *Hukum dan Teknologi Informasi: Konsep Dasar dan Implikasinya* (Jakarta: Prenadamedia Group, 2021), 85.
[9] Johan, "Smart Contracts dan Tantangan Hukum Perdata di Era Blockchain," *Jurnal Hukum Teknologi dan Masyarakat*, vol. 3, no. 1 (2025): 45–67.
[10] Wahyuni, R., et al., "Perlindungan Konsumen dalam Kontrak Digital," *Jurnal Perlindungan Hukum Konsumen*, vol. 2, no. 2 (2023): 101–120.
[11] Afrilhani, D., & Dwijayanthi, N., "Penerapan Smart Contract dalam Perspektif Hukum Perdata Indonesia," *Jurnal Hukum & Teknologi*, vol. 1, no. 1 (2024): 22–38.
[12] Khatimah, S. N., "Mekanisme Arbitrase Teknologi dalam Penyelesaian Sengketa Kontrak Digital," *Indonesian Journal of Law and Innovation*, vol. 5, no. 1 (2024): 88–104.
[13] Putra, H. R., "Urgensi Audit Kode dalam Mencegah Penyalahgunaan Smart Contract," *Jurnal Keamanan Siber & Hukum Digital*, vol. 4, no. 2 (2025): 56–73.
[14] Afrihani, A., dan P. T. Dwijayanthi, "Eksistensi Smart Contract dalam Cryptocurrency: Perspektif Hukum di Indonesia," *Kertha Semaya: Journal Ilmu Hukum* 12, no. 8 (2024): 1747–1756

based agreements.[15] Wahyuni, Dewi, & Suryani (2023) focus on consumer protection in digital transactions[16], while Fitri (2022) analyzes conceptual approaches in normative legal research.[17] These studies reveal a gap: most focus on specific technical or consumer issues but lack a comprehensive reformulation of Indonesia's contract law paradigm in response to digitalization.

Therefore, this paper raises the central question: how should the paradigm of contract law in Indonesia be reformulated to effectively address the challenges posed by the digital contract era, particularly smart contracts that operate autonomously?[18]

This research adopts a normative legal methodology with conceptual and comparative approaches. The data are obtained through literature review of legal documents, academic journals, and comparative studies of jurisdictions that have more advanced regulations on digital contracts.[19] The analysis is conducted qualitatively, with emphasis on legal reasoning and normative logic.[20]

The main conclusion of this study is that the contract law paradigm must be reconstructed by recognizing digital technologies especially smart contracts as normative subjects that influence the structure and dynamics of contractual relationships. The law must not only accommodate digital media, but also respond to the operational logic of autonomous, non-negotiable, and transnational technologies.[21]

To support this conclusion, the paper is divided into several argumentative sections. First, an explanation of the transformation in the form and mechanisms of digital agreements, and the challenges these pose to traditional principles of contract law. Second, an analysis of the legal vacuum and normative gap in Indonesia's legal system regarding digital contracts.

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[15] Suwinto Johan dan Sugiarto, "Who Should Regulate the Industry of Financial Technology?" *Pandecta Research Law Journal* 17, no. 1 (2021): 103–120

[16] Wahyuni, Rina, Luh Ayu Dewi, and Maya Suryani. "Perlindungan Konsumen dalam Kontrak Digital." *Jurnal Perlindungan Hukum Konsumen* 2, no. 2 (2023): 101–120.

[17] Fitri, M. T. "Pendekatan Konseptual dalam Penelitian Hukum Normatif." *Jurnal Ilmu Hukum* 12, no. 1 (2022): 17–32.

[18] N. J. De Filippi & S. Hassan, "Blockchain Technology as a Regulatory Technology: From Code is Law to Law is Code," *First Monday* 21, no. 12 (2016).

[19] J. Fairfield, "Smart Contracts, Bitcoin Bots, and Consumer Protection," *Washington and Lee Law Review Online* 71 (2014): 35–50; Raskin, M., "The Law and Legality of Smart Contracts," *Georgetown Law Technology Review* 1, no. 2 (2017): 305–341.

[20] M. T. Fitri, "Pendekatan Konseptual dalam Penelitian Hukum Normatif," *Jurnal Ilmu Hukum* 12, no. 1 (2022): 17–32.

[21] D. Rachmadsyah, "Kecerdasan Buatan dan Transformasi Konsep Subjek Hukum," *Jurnal Hukum dan Teknologi* 2, no. 1 (2023): 13–29; Syahrul, M., "Reformulasi Hukum Perjanjian dalam Era Digital," *Jurnal Legislasi Indonesia* 19, no. 2 (2022): 125–138.

Third, a comparative discussion of how other jurisdictions have approached the regulation of smart contracts. Fourth, a proposal for reformulating the contract law paradigm to be more adaptive to technological developments, in terms of norms, principles, and enforcement mechanisms.

## DIGITAL TRANSFORMATION AND ITS RELEVANCE TO THE CONTRACT LAW SYSTEM

Digitalization, as a key manifestation of the Fourth Industrial Revolution, has reshaped patterns of social interaction, economic transactions, and human communication. This transformation has had a significant impact on legal systems, particularly contract law. Case studies in Indonesian fintech (e.g., OVO, GoPay) demonstrate the rapid adoption of automated agreements, while marketplace platforms like Shopee and Lazada enforce non-negotiable clickwrap agreements that often lack adequate consumer protection. Contracts that were previously based on written documents and direct interactions are now evolving into digital forms executed automatically through electronic systems, such as blockchain-based smart contracts. This shift challenges the fundamental principles of contract law, including the freedom of contract and mutual consent.[22]

Globally, digital contracts have developed in two main forms electronic contracts and smart contracts. Electronic contracts are still subject to digital negotiation and consent. In contrast, smart contracts are self-executing and immutable, meaning they are performed entirely by source code without human intervention.[23] This distinction affects the legal validity and enforceability of such agreements under positive law.

In Indonesia, regulations on electronic documents and signatures are governed by Law No. 11 of 2008 on Electronic Information and Transactions (ITE Law), as amended by Law No. 19 of 2016. However, these provisions do not explicitly address blockchain-based automated contracts.[24] This creates a gap between the rapidly evolving digital practices and a legal structure that remains predominantly human-centered.

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[22] Satjipto Rahardjo, *Ilmu Hukum* (Bandung: Citra Aditya Bakti, 2000), 85.
[23] Teguh Prasetyo dan Ruslan Saleh, "Urgensi Hukum Digital dalam Era Industri 4.0," *Jurnal Hukum dan Teknologi* 3, no. 1 (2021): 5
[24] Undang-Undang Republik Indonesia Nomor 11 Tahun 2008 tentang Informasi dan Transaksi Elektronik, sebagaimana telah diubah dengan Undang-Undang Nomor 19 Tahun 2016

The relevance of digital transformation to contract law is reinforced by empirical data. A 2021 survey by the Indonesia Services Dialogue (ISD) and the Ministry of Cooperatives and SMEs revealed that 79% of MSMEs reported increased income after adopting digital technologies; 63% experienced cost efficiency; and 85% expanded their markets through online transactions.[25] A 2024 survey by Eastasouth Institute involving 150 MSMEs also found a strong correlation between digital adoption and improved business performance.[26] These findings demand both conceptual and normative adaptation of Indonesia's contract law. Digital transformation has also introduced new legal phenomena. For instance, app-based contracts are often activated automatically once users agree to terms of service typically without reading the full content. This raises questions about legal awareness and the validity of consent in contract law.

Moreover, digital contracts no longer involve only two human parties but may involve human–machine or even machine–machine interactions. This condition compels the legal system to recognize digital entities as contractual participants or, at minimum, as actors in contract execution.

While digitalization enhances efficiency and speed in business transactions, the law must not sacrifice legal protection, especially for technologically disadvantaged parties. The phenomenon of clickwrap agreements, where users agree to terms simply by clicking "I agree," has become standard in digital transactions. Yet, does this act fulfill the notion of free consent as outlined in Article 1320 of the Indonesian Civil Code? Such questions necessitate a reexamination of the concept of consensus in modern contract law.

The use of artificial intelligence (AI) in contract drafting is also on the rise. Some legaltech platforms now offer AI-generated standard contracts based on user inputs. This introduces new challenges: Who is liable if errors occur in AI-generated contracts?
On the other hand, digitalization increases the potential for contract misuse, such as algorithmic contracts that bind consumers to unfavorable clauses. Therefore, consumer protection must be an integral part of contract law transformation.

Thus, digital transformation requires a reformulation of the fundamental principles of contract law to accommodate evolving demands and challenges.

[25] Indonesia Services Dialogue, "Laporan Adopsi Digital UKM," (Jakarta: ISD dan Kemenkop UKM, 2021), diakses 10 Juli 2025, https://isd-indonesia.org/laporanukm2021.
[26] Eastasouth Institute, "UKM dan Teknologi: Survei Nasional 2024," diakses 10 Juli 2025, https://eastasouth.org/report-ukm-digital.

## EPISTEMOLOGICAL AND NORMATIVE GAPS BETWEEN CONVENTIONAL LEGAL SYSTEMS AND DIGITAL CONTRACTS

Indonesia's contract law is rooted in classical principles outlined in Article 1320 of the Civil Code, including consent, capacity, a specific object, and a lawful cause.[27] These principles originated in the context of personal interaction not automated digital exchanges. When contracts are encoded and executed by systems without human intervention, the legal notions of free will and mutual consent become ambiguous. Here lies the epistemological gap: law interprets contracts as text, while digital reality frames them as executable code. This gap raises normative issues: How do we interpret intent when consent is expressed with a mere click? Who bears responsibility for harm caused by automated execution? How is revocation possible when the system does not allow for modification? These questions cannot be answered using conventional interpretations of volition and agreement.

Smart contracts deployed on blockchain systems are immutable and cannot be unilaterally revoked. Their decentralized and unalterable nature complicates legal tracking, evidence gathering, and enforcement.[28] Currently, Indonesia lacks specific legal norms that address these unique features. For instance, the provisions of Articles 1244 and 1245 of the Civil Code on force majeure are difficult to apply in cases where renegotiation is technically impossible.[29]

Furthermore, the cross-border nature of digital contracts introduces jurisdictional challenges. Without clear regulations, there is uncertainty over forum selection for dispute resolution. In practice, contract parties may reside in different jurisdictions from the server or transaction location, making it difficult to determine applicable law and competent authority.[30] Digital contracts also often eliminate interpretative flexibility. Legal language is replaced by programming code, which is rigid and technical. This hinders judges or arbitrators from interpreting the parties' intent during disputes.

Another issue concerns digital evidence. Conventional courts rely on verifiable physical or electronic documents. However, smart contracts on blockchain require technical expertise

[27] Kitab Undang-Undang Hukum Perdata (Burgerlijk Wetboek), Pasal 1320.
[28] Firmanda, Hengki, "Syari'ah Card (Kartu Kredit Syariah) Ditinjau dari Asas Utilitas dan Maslahah," *Jurnal Ilmu Hukum Fakultas Hukum Universitas Riau* 5, no. 2 (2014): 263, http://dx.doi.org/10.30652/jih.v4i2.2793
[29] Kitab Undang-Undang Hukum Perdata (Burgerlijk Wetboek), Pasal 1244 dan 1245.
[30] Richard Kimberly Heck, "About the Philosophical Gourmet Report," last modified August 5, 2016, http://rgheck.frege.org/philosophy/aboutpgr.php

for verification something law enforcement may lack. This epistemological divide also results in disharmony between national and global legal systems. Many jurisdictions have adopted progressive approaches to digital contracts, while Indonesia continues to rely on classical legal doctrines.

Conflicts may arise between national laws and international norms governing digital contracts. For instance, if a smart contract involving an Indonesian business and a foreign partner fails, which legal system applies?

The absence of technical and ethical standards for digital contract drafting further widens the legal gap. Without clear guidelines, businesses can create one-sided contracts, increasing the risk of abuse.

Thus, the epistemological and normative gaps must be urgently bridged through a more adaptive and transnational regulatory approach.

## THEORETICAL FOUNDATIONS SUPPORTING CONTRACT LAW IN THE DIGITAL CONTEXT

The advancement of information technology has prompted new perspectives in interpreting the fundamental principles of contract law. The Instrumentalist Theory of Law, which views law as a tool to achieve social objectives, offers a relevant framework for responding to the need for legal reform in the digital era.[31] Within this perspective, law is not a static normative system but an adaptive mechanism that must evolve alongside societal transformations and technological progress. Therefore, contract law in the digital sphere cannot rely solely on consensualism and freedom of contract it must also incorporate principles of contractual justice, protection of the weaker party, and inclusive access to justice in the virtual domain.

Furthermore, Cyberlaw as a contemporary legal approach provides a framework that situates legal systems within the borderless, instantaneous, and often anonymous nature of cyberspace.[32] These characteristics challenge national legal systems to extend their reach to cover digital activities, including electronic contracts and online transactions. In practice, emerging forms such as click-wrap agreements, browse-wrap agreements, and smart contracts

[31] Satjipto Rahardjo, *Ilmu Hukum* (Bandung: Citra Aditya Bakti, 2000), hlm. 57
[32] Abdul Wahid dan Mohammad Labib, *Delik-Delik Informasi Teknologi* (Bandung: Refika Aditama, 2005), hlm. 21–25.

which operate based on automation and algorithmic code demand a reinterpretation of legal concepts such as intent, good faith, and mutual consent, which were traditionally understood as explicit and documented in writing.

In terms of evidentiary standards, the recognition of the legal validity of electronic documents is a primary concern. Article 5(1) of Law No. 11 of 2008 on Electronic Information and Transactions (ITE Law) explicitly acknowledges that electronic information and/or electronic documents constitute valid legal evidence.[33] However, in practice, this provision still faces technical challenges, particularly concerning digital identity authentication, document integrity, and the reliability of electronic systems used in contract execution.[34] Hence, it is imperative for the legal system to ensure reliability and security at every stage of the formation and performance of digital contracts.

The concept of legal certainty also serves as a foundational pillar for the development of a contract law system relevant to the digital age. The lack of uniform norms across jurisdictions regarding the validity of electronic signatures, the recognition of digital certificate providers, and the mechanisms for executing digital contracts often results in legal uncertainty, particularly in cross-border contexts.[35] This underscores the importance of harmonizing national legal norms with international frameworks such as the UNCITRAL Model Law on Electronic Commerce, which provides guidance in creating consistent and reliable regulations.[36] By doing so, both businesses and consumers can engage in digital transactions without fear of ambiguity in the legal norms that govern them.

Finally, John Rawls's Theory of Justice offers an ethical and normative foundation for evaluating substantive fairness in digital legal relationships. Many digital contracts especially those issued by large platforms are presented in take-it-or-leave-it formats, offering no room for negotiation.[37] In such contexts, the principle of justice calls for the evaluation of the distribution of rights and obligations to prevent imbalances and exploitative arrangements. To uphold this, it is crucial to enforce principles such as transparency, informed consent, and the

[33] Pasal 5 ayat (1) Undang-Undang Nomor 11 Tahun 2008 tentang Informasi dan Transaksi Elektronik.
[34] N. E. Alamsyah dan S. H. Nainggolan, "Validitas Pembuktian Dokumen Elektronik dalam Hukum Acara Perdata," *Jurnal Hukum dan Pembangunan*, Vol. 51 No. 1 (2021): 113–134.
[35] T. H. Ginting, "Problematika Kepastian Hukum Kontrak Digital di Indonesia," *Jurnal Hukum & Teknologi*, Vol. 2 No. 2 (2020): 45–60.
[36] United Nations Commission on International Trade Law (UNCITRAL), *Model Law on Electronic Commerce with Guide to Enactment 1996*, dengan amendments 1998.
[37] Rawls, John, *A Theory of Justice* (Cambridge: Harvard University Press, 1971).

provision of fair and accessible dispute resolution mechanisms, particularly for parties with limited digital literacy.[38]

## REFORMULATING CONTRACT LAW TO ADDRESS THE CHALLENGES OF DIGITAL CONTRACTS

The transformation of contract law to respond to digital contract challenges requires a multidimensional approach. First, from a legal theory perspective, the paradigm must shift from positivist to progressive legal thinking. Law must not only provide certainty but also respond to the demands of substantive justice in digital contexts.[39]

Second, from a normative perspective, new legal concepts should be developed, including digital consent, automated obligations, and technological liability. Digital consent is defined as legally valid approval expressed electronically, including clickwrap, browsewrap, or algorithmic consent models, often without the user reading the terms.[40] Meanwhile, technological liability refers to the legal responsibility for damages caused by technical failures, smart contract bugs, security breaches, or algorithmic errors in automated execution.[41] These concepts are vital to formulating future digital contract regulations. Countries such as Estonia, Singapore, and members of the European Union have adopted such frameworks for instance, the eIDAS Regulation in the EU.[42]

Third, at the institutional level, a technological audit authority is needed to verify smart contracts prior to their use. In addition, cross-jurisdictional digital dispute resolution forums should be developed to match the nature of digital transactions.

Capacity-building among legal professionals is also key. Judges, prosecutors, and lawyers must gain digital legal literacy to assess the validity and legality of digital contracts. Governments should promote interdisciplinary research in law and technology to enrich academic discourse and support evidence-based regulatory development.

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[38] I. Irawan, "Asas Keadilan dalam Kontrak Elektronik Berbasis Platform Digital," *Jurnal Hukum dan Masyarakat Digital*, Vol. 4 No. 1 (2023): 78–93.
[39] Hans Kelsen, *Pure Theory of Law*, trans. Raisul Muttaqien (Bandung: Nusamedia, 2006), 112.
[40] Richards, N., & Hartzog, W. (2018). The pathologies of digital consent. *Wash. UL Rev.*, *96*, 1461.
[41] Rizos, E. (2022). A contract law approach for the treatment of smart contracts''bugs'. *European Review of Private Law*, *30*(5).
[42] European Union, *eIDAS Regulation: Regulation (EU) No 910/2014 on Electronic Identification and Trust Services for Electronic Transactions in the Internal Market*, Official Journal of the European Union, July 23, 2014

Furthermore, civil society involvement in policy formulation is essential. Technology users, business actors, and consumer organizations must participate in creating fair and transparent digital contract standards.

Adopt insights from the legal frameworks of Singapore, Estonia, and the European Union, which have pioneered adaptive regulatory approaches to blockchain-based contracts.[43] Another effective strategy is to implement a sandbox regulatory approach to test digital contract models in controlled environments before full-scale implementation, thereby reducing legal risks while fostering innovation.[44]

Enhancing public digital legal literacy is equally important. Citizens must understand their rights and obligations in digital transactions to avoid exploitation through unethical contracts.[45]

International cooperation is vital in establishing a global framework for digital contract law. Indonesia must actively engage in international forums to ensure that its interests are represented in global norm-setting processes. Ultimately, the success of contract law reform in the digital era depends on political will and institutional capacity. Without support from policymakers, these efforts will remain mere academic discourse.

## CONCLUSION

Digital transformation has introduced new challenges to the practice of contract law in Indonesia. Digital contracts, including smart contracts, not only alter the form and execution mechanisms of agreements, but also demand conceptual and normative adjustments within the national legal system. The current paradigm of contract law rooted in textual interpretation and the explicit will of the parties must be reformulated to accommodate code-based contracts that operate autonomously.

The gap between conventional legal approaches and digital realities has created significant epistemological and normative issues. The fundamental principles of contract law as outlined in the Indonesian Civil Code are not fully equipped to address the complexities of digital contracts, which are often cross-jurisdictional, self-executing, and resistant to

[43] Rastogi, V. (2023). Revolutionizing Legal Contracts: The Integration of Blockchain-Based Smart Contracts and Regulatory Adaptations. *Nyaayshastra L. Rev.*, *4*, 1.
[44] Seferi, F. (2025). A comparative analysis of regulatory sandboxes from selected use cases: Insights from recurring operational practices. In *Regulatory sandboxes for AI and Cybersecurity. Questions and answers for stakeholders* (pp. 145-176). CINI's Cybersecurity National Lab.
[45] Versaci, G. (2018). Personal data and contract law: challenges and concerns about the economic exploitation of the right to data protection. *European Review of contract law*, *14*(4), 374-392.

modification. This legal uncertainty threatens the protection of contracting parties and may undermine trust within the digital transaction ecosystem.

To address these challenges, it is essential to reformulate contract law through a progressive theoretical framework, the development of new legal norms responsive to technological innovation, and institutional renewal to support oversight and dispute resolution in digital contracts. An interdisciplinary approach that integrates law and technology is crucial to establishing a contract law system that remains relevant and responsive to digital dynamics. Therefore, Indonesia's contract law must evolve from a static normative paradigm into a dynamic and contextual legal system one that can uphold relevance, certainty, and justice in the digital era.

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