



## Establishing Legal Certainty in the Digital Era: Challenges and Solutions

Abdul Rahman Toyi,<sup>1</sup> Elmira Zachra Putri Hamidun <sup>2</sup>

<sup>1</sup> Faculty of Law, State University of Gorontalo, Indonesia.

<sup>2</sup> Faculty of Law, Veteran National Development University

Correspondence E-mail: [abdrahmantoyi04@gmail.com](mailto:abdrahmantoyi04@gmail.com)

**Abstract:** This article aims to examine the challenges and formulate solutions in building legal certainty in the digital era in Indonesia. This writing uses a normative legal method with a legislative, conceptual, and comparative case study approach. The analysis shows that the rapid development of digital technology has revealed various legal challenges, such as inconsistencies in regulations before the enactment of the Personal Data Protection Law, the lag of legislation compared to technological innovation, fragmentation of authority between institutions, the dilemma between encouraging innovation and protecting individual rights, and the complexity of jurisdiction in international cyber law. To answer these challenges, comprehensive legal reform is needed, the establishment of an independent institution for personal data protection, regulatory harmonization, and strengthening international cooperation. Furthermore, the concept of Agile Lawmaking, the implementation of Legal Tech and Smart Contracts, and digital legal education reform are the keys to building an adaptive and responsive legal system, as demonstrated by best practices from Estonia and Singapore. As a recommendation, it is necessary to immediately update regulations based on real-time data, develop a national digital legal ecosystem, increase the capacity of legal officers, and actively involve the community in formulating policies to ensure legal certainty while encouraging sustainable digital economic growth.

**Keywords:** Legal Certainty; Digital Era; Agile Lawmaking; Legal Tech.

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# 1. Introduction

The digital era has revolutionized the way legal interactions are conducted, creating a new landscape that combines traditional norms with cutting-edge technologies such as artificial intelligence (AI) and blockchain. The presence of this technology not only accelerates the process of creating and implementing contracts through automated smart contracts, but also opens up new opportunities for online dispute resolution, both through virtual mediation and digital arbitration. On the other hand, this transformation raises a serious dilemma: how to maintain fundamental principles such as legal certainty, justice, and protection of human rights in a system that continues to innovate? Multazam and Widiarto emphasize that the digitalization of law in Indonesia does bring bureaucratic efficiency and ease of access, but is overshadowed by serious challenges such as cybersecurity risks, potential data misuse, and inequality in access to technology. <sup>1</sup>This requires a systemic response in the form of increasing digital literacy for legal actors, as well as reforming the legal education curriculum to be more adaptive to technological developments. If not anticipated wisely, then instead of strengthening the legal system, digitalization can actually weaken the basic principles that have been the pillars of upholding justice.

Smart contracts, as a revolutionary product of blockchain technology, present a new way of executing contracts that is automatic, transparent, and does not require human intervention, so that theoretically it can reduce the risk of default and accelerate the execution of agreements. In Indonesia, the implementation of smart contracts, especially in the realm of e-commerce, has been considered in line with the principle of freedom of contract as stipulated in Article 1338 of the Civil Code, which provides flexibility for parties to make agreements as long as they do not conflict with the law, public order, and morality. However, this automation brings with it serious challenges in legal practice, especially when there is a breach of obligation, force majeure, or when one of the parties wants to change the clauses in the agreement. Because smart contracts are encoded with rigid and deterministic software logic, the system will continue to execute the contents of the contract even though the real conditions of the parties have changed significantly. <sup>2</sup>This inflexibility raises concerns about the erosion of the values of justice and legal considerations that are usually considered humanely in resolving disputes, thus requiring a new approach in the interpretation of contract law and the potential for the formation of regulations that can accommodate the dynamics of technology without sacrificing the principles of essential civil law.<sup>3</sup>

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<sup>1</sup> Mochammad Tanzil Multazam and Aan Eko Widiarto, "Digitalization of the Legal System: Opportunities and Challenges for Indonesia," *Rechtsidee* 11, no. 2 (December 25, 2023): 10.21070/jihr.v12i2.1014-10.21070/jihr.v12i2.1014, <https://doi.org/10.21070/jihr.v12i2.1014>.

<sup>2</sup> I. Putu Gede Angga Wiliana Putra and Dewa Ayu Dian Sawitri, "Legalitas Smart Contract Dalam Transaksi Elektronik Di E-Commerce Menurut Perspektif Hukum Perdata Di Indonesia," *Kertha Semaya: Journal Ilmu Hukum* 12, no. 12 (December 17, 2024): 3182-93, <https://doi.org/10.24843/KS.2024.v12.i12.p06>.

<sup>3</sup> Rifky Pulubolo, Mutia Cherawaty Thalib, and Ahmad Ahmad, "Legal Process for Banking Negligence in Violations of Customers' Privacy Rights and Personal Data," *Estudiante Law Journal* 1, no. 1 (January 25, 2024): 1-13, <https://doi.org/10.33756/eslaj.v1i1.24195>.

Blockchain technology is present as a disruptive innovation that promises high transparency, data integrity that is difficult to manipulate, and a decentralized recording system, making it very relevant in the context of legal transactions that demand reliability and clarity of track records.<sup>4</sup>In practice, blockchain can strengthen the principle of legal certainty by providing immutable digital evidence, accelerating the verification process, and reducing the need for intermediaries in various forms of contracts or legal deeds. However, in Indonesia, the implementation of blockchain in the legal system still faces quite complex challenges, especially in terms of regulation and readiness of legal infrastructure. According to Megawati et al., although the role of blockchain is very potential in improving data security and supporting legal certainty in digital-based transactions, the absence of a comprehensive legal framework and the absence of national standards that regulate the legal validity of blockchain data are major obstacles to its widespread use.<sup>5</sup>In addition, the lack of synergy between technology regulators and judicial institutions has resulted in a legal vacuum that can lead to uncertainty in resolving disputes involving this technology.<sup>6</sup>Therefore, strategic steps are needed, including the formation of special regulations, increasing the capacity of human resources in the fields of law and technology, and strengthening an inclusive digital ecosystem so that blockchain can be optimally utilized in the Indonesian legal system without abandoning the principles of justice, legality, and protection of citizens' constitutional rights.

The rapid development of e-commerce driven by technological advances such as *the Internet of Things* (IoT) has brought significant changes in people's consumption patterns and expanded the scope of digital transactions across regions and jurisdictions. However, the convenience and connectivity offered by IoT also opens up a big gap for leaks and misuse of personal data, especially because IoT devices constantly collect, process, and transmit sensitive user data without their knowledge. Oktaviona, critically highlights that the cybersecurity system implemented in the e-commerce sector in Indonesia has not been fully able to anticipate the complexity of modern cyber attacks, making it vulnerable to data leaks, phishing, and illegal profiling practices.<sup>7</sup>This condition not only raises legal implications in the form of violations of privacy rights, but also gives rise to broader social impacts, such as the loss of public trust in digital platforms and increased consumer vulnerability to algorithmic manipulation. Therefore, this challenge demands the presence of stronger, more comprehensive, and proactive legal protection for personal data in digital transactions, not only through strict enforcement of the Personal Data Protection Law

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<sup>4</sup> Tito Wira Eka Suryawijaya, "Memperkuat Keamanan Data melalui Teknologi Blockchain: Mengeksplorasi Implementasi Sukses dalam Transformasi Digital di Indonesia," *Jurnal Studi Kebijakan Publik* 2, no. 1 (May 31, 2023): 55–68, <https://doi.org/10.21787/jskp.2.2023.55-68>.

<sup>5</sup> Leny Megawati, Cecep Wiharna, and Asep Hasanudin, "Peran Teknologi Blockchain Dalam Meningkatkan Keamanan Dan Kepastian Hukum Dalam Transaksi Kontrak Di Indonesia," *Jurnal Hukum Mimbar Justitia* 9, no. 2 (December 30, 2023): 410–35, <https://doi.org/10.35194/jhmj.v9i2.3856>.

<sup>6</sup> Abdusalam Rauf, Fenty U. Puluhulawa, and Ahmad Ahmad, "Ideal Arrangements for Fines to Enhance Legal Awareness and Minimize Waste Effectively in Society," *Estudiante Law Journal* 6, no. 3 (October 10, 2024): 593–606, <https://doi.org/10.33756/eslaj.v6i3.28916>.

<sup>7</sup> Bintang Sutra Oktaviona, "Analisis Hukum Penerapan Blockchain Dan Internet of Things (Iot) Pada Perlindungan Data Pribadi Dalam Transaksi Bisnis E-Commerce Di Indonesia," *Proceedings Series on Social Sciences & Humanities* 17 (July 30, 2024): 38–43, <https://doi.org/10.30595/pssh.v17i.1101>.

(PDP Law), but also through the establishment of an independent supervisory institution, increasing transparency of platform algorithms, and educating the digital community so that awareness of rights and obligations in cyberspace can grow critically and sustainably.<sup>8</sup>

The use of artificial intelligence (AI) in various aspects of life, from the creative industry to the business and government sectors, has created new challenges in the legal realm, especially regarding intellectual property rights (IPR). One of the big questions that arises is: who actually has the rights to the creations produced by AI? Wendur, highlighted the urgency of legal protection for IPR in the context of the use of AI, because algorithms are now not only tools, but also creative actors capable of producing original works such as writing, music, and design.<sup>9</sup> In this rapidly developing digital landscape, legal regulations are needed that not only guarantee legal certainty, but are also able to adapt to the dynamics of technology that does not wait.

In the context of online agreements, digitalization has also changed the face of dispute resolution. Ari et al. (2024) noted that classic issues such as cross-border jurisdiction, digital consumer protection, and the validity of electronic evidence are the main focus in the era of online contracts.<sup>10</sup> To respond to this condition, alternative dispute resolution methods such as *Online Dispute Resolution* (ODR) have begun to be adopted, offering speed, efficiency, and accessibility, but still facing challenges in terms of cross-border recognition and execution of decisions. In line with this, Blassys Bevy Sinaga et al., emphasized the importance of building an adaptive, progressive, and inclusive legal framework so that it not only becomes a safety fence, but also a catalyst for healthy and innovative digital economic growth. In the Indonesian context, this means that the law must be able to compete with the speed of technological innovation, without losing the spirit of justice and legal certainty as the main foundations of the rule of law. Therefore, the development of technology-based regulations is not only an urgent need, but also a determinant of the future direction of national law in the increasingly complex and fluid digital era.<sup>11</sup>

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<sup>8</sup> Azhara Afrihani and Putri Triari Dwijayanthi, "Eksistensi Smart Contract Dalam Cryptocurrency: Perspektif Hukum Di Indonesia," *Kertha Semaya : Journal Ilmu Hukum* 12, no. 8 (March 29, 2024): 1747–56, <https://doi.org/10.24843/KS.2024.v12.i08.p06>.

<sup>9</sup> Aldo H. B. Wendur, "Perlindungan Hukum Terhadap Hak Kekayaan Intelektual Di Era Digital Dalam Penggunaan Artificial Intelligence," *LEX ADMINISTRATUM* 12, no. 2 (May 8, 2024), <https://ejournal.unsrat.ac.id/v3/index.php/administratum/article/view/55510>.

<sup>10</sup> Ernesta Arita Ari et al., "Perkembangan Hukum Perdata Dalam Penyelesaian Sengketa Perjanjian Online:," *Jurnal Kolaboratif Sains* 7, no. 11 (November 30, 2024): 4085–89, <https://doi.org/10.56338/jks.v7i11.6361>.

<sup>11</sup> "Peran Teknologi Blockchain Sebagai Instrumen Pembangunan Penegakan Hukum Berbasis Digital & Mewujudkan Masyarakat Berkeadilan Di Era Society 5.0 | Padjadjaran Law Review," accessed May 10, 2025, <https://jurnal.fh.unpad.ac.id/index.php/plr/article/view/1651>.

## 2. Method

The writing method in this article uses a juridical-normative approach<sup>12</sup> supported by a conceptual and comparative approach, which aims to analyze legal certainty in the context of the development of digital technology. Data were obtained through a literature study covering laws and regulations, legal literature, court decisions, and official documents from related institutions such as the Ministry of Communication and Information, BSSN, and the Supreme Court. The analysis was carried out qualitatively with descriptive-analytical techniques, in order to unravel the problem of legal certainty and identify relevant solutions based on legal theories and regulatory practices in several developed countries that have adopted a more progressive digital legal system.

## 3. Analysis and Discussion

### 3.1. Challenge Certainty Law in the Digital Age

#### 3.1.1. Regulatory Inconsistency and Ambiguity: A Case Study of Personal Data Protection

Before the enactment of Law Number 27 of 2022 concerning Personal Data Protection (UU PDP), Indonesia was in a situation that was almost like a "no man's land" in terms of personal data protection. The absence of a complete and integrated national legal umbrella meant that protection of personal data depended only on fragmented sectoral regulations, such as in the banking, telecommunications, and health sectors.<sup>13</sup> Each sector has its own provisions, but none of them cover the issue of data protection comprehensively. This condition creates a gray area in the practice of personal data protection and complicates the law enforcement process when violations occur. This legal uncertainty opens up great opportunities for data misuse by corporations and third parties without a clear accountability mechanism. In fact, state institutions often experience data leaks, which ironically are not accompanied by adequate accountability. In a climate like this, the right to individual privacy as part of human rights seems to be ignored, and citizens lose control over their own personal information.

One of the most striking examples of this weak legal protection is WhatsApp's policy in 2021, which forced users in Indonesia to agree to share their personal data with its parent company, Facebook (Meta). In the absence of regulations protecting users from such practices, people have no choice but to submit to this unilateral policy if they want to continue using the service. This is in stark contrast to the situation in the

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<sup>12</sup> Irwansyah Irwansyah, *Penelitian Hukum ; Pilihan Metode & Praktik Penulisan Artikel* (Yogyakarta: Mirra Buana Media, 2020); Peter Mahmud Marzuki, *Penelitian Hukum*, Edisi Revisi (Jakarta: Prenadamedia Group, 2014); Mukti Fajar and Yulianto Achmad, *Dualisme Penelitian Hukum : Normatif & Empiris* (Yogyakarta: Pustaka Pelajar, 2010).

<sup>13</sup> Bella Christine and Christine S. T. Kansil, "Hambatan Penerapan Perlindungan Data Pribadi Di Indonesia Setelah Disahkannya Undang-Undang Nomor 27 Tahun 2022 Tentang Perlindungan Data Pribadi," *Syntax Literate ; Jurnal Ilmiah Indonesia* 7, no. 9 (2022): 16331–39, <https://doi.org/10.36418/syntax-literate.v7i9.13936>.

European Union, where the General Data Protection Regulation (GDPR) provides strong protection to individuals, allowing them to opt out of policies that do not comply with the principles of transparency and consent. There, WhatsApp had to change its approach so as not to violate the provisions of the GDPR, even risking being subject to large administrative sanctions. This inequality shows that without a solid and binding legal framework such as the PDP Law, the position of the Indonesian people in dealing with giant global corporations is very vulnerable and weak.<sup>14</sup> Therefore, the ratification of the PDP Law is an important milestone in the journey of Indonesian law towards a more ethical, fair, and just digital era, although its future implementation still requires institutional strengthening, massive socialization, and adjustment of derivative regulations so that the norms contained therein can truly live in practice and not just legal symbols on paper.

### **3.1.2. Legislation Lags Behind Technological Innovation**

Technological innovation is developing at an exponential rate, breaking through geographical boundaries and shaking up conventional legal systems. Amidst these dynamics, the legislative process in Indonesia is still proceeding at a slow and bureaucratic pace. One of the most obvious examples of this gap is the long journey of the Personal Data Protection Bill (RUU PDP), which was initiated in 2014 but was only successfully passed eight years later in 2022.<sup>15</sup> During this waiting period, the public and business actors lived in worrying legal uncertainty. Without regulatory certainty, digital industry players are in a dilemma: on the one hand, they are required to comply with data protection principles in accordance with global standards, but on the other hand, they do not have a national legal basis that can be used as a firm reference. As a result, the practice of collecting, processing, and distributing personal data takes place without adequate control, and when a violation of privacy rights occurs, victims often do not know where to complain or who to sue.

This gap between innovation and legislation not only risks weakening consumer protection, but can also hamper the pace of development of Indonesia's digital economy as a whole. When regulation lags far behind technology, the growth space for start-ups, digital platforms, and data-based service providers becomes narrow because legal uncertainty creates an atmosphere that is not conducive to investment and business development. Furthermore, the state could lose its legitimacy in regulating the digital space if it is unable to establish responsive and anticipatory laws. In fact, the digital era requires a legal framework that is flexible but firm, progressive but based on the principles of justice and human rights. Therefore, legislative reform can no longer be seen as a mere administrative routine, but rather as a national

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<sup>14</sup> Andre Arditya, Ignatius Raditya Nugraha, and Andre Arditya and Ignatius Raditya Nugraha, "RUU PDP Belum Penuhi Standar Internasional Perlindungan Data Pribadi," *Magdalene.co* (blog), February 2, 2021, <https://magdalene.co/story/ruu-pdp-belum-penuhi-standar-internasional-perlindungan-data-pribadi/>.

<sup>15</sup> Ali Mustofa, "Analisis Hukum RUU Perlindungan Data Pribadi (PDP)," June 26, 2021, <https://www.law-justice.co/artikel/111345/analisis-hukum-ruu-perlindungan-data-pribadi-pdp/>.

strategy to ensure that the law is not left behind by the times. Reform is needed in the process of drafting legislation in terms of speed, transparency, and public involvement so that the law can function as an anchor of certainty as well as a dynamo of progress amidst the waves of technological innovation that never wait.

### **3.1.3. Fragmentation of Regulatory Institutions and Overlapping of Authority**

Digital technology regulation in Indonesia is currently in a complex and fragmented institutional landscape, where various agencies such as the Ministry of Communication and Information (Kominfo), the Financial Services Authority (OJK), and the National Cyber and Crypto Agency (BSSN) each play their own roles in regulating and supervising the digital ecosystem.<sup>16</sup> Although the diversity of these authorities reflects attention to various digital aspects, such as data protection, cybersecurity, and digital financial services, in practice it actually creates overlapping authorities and policy disharmony. One prominent example is the dual role of Kominfo, which on the one hand is designated as the supervisory authority for personal data protection, but on the other hand also acts as a data manager and user through various digital-based public services.<sup>17</sup> This condition creates the potential for serious conflicts of interest and blurs the lines between regulators and operators. The absence of a special independent institution tasked exclusively with supervising personal data protection further exacerbates this situation, because there is no institution that is truly neutral and has full authority to enforce the principles of accountability, transparency, and data sovereignty.<sup>18</sup> As a result, efforts to protect citizens' privacy rights are vulnerable to bureaucratic bias and tug-of-war of interests between institutions. To create an effective and fair regulatory system in the digital era, serious institutional reform is needed, including the establishment of an independent authority with a single mandate in personal data protection as well as a strong and integrated cross-sector coordination system, so that the law does not only live in text, but is also present in real protection for the public.

### **3.1.4. Dilemma Between Innovation and Rights Protection**

Technologies such as financial technology (fintech) and artificial intelligence (AI) have revolutionized the way humans transact, access financial services, and produce and consume information. These innovations bring a breath of fresh air for efficiency, financial inclusion, and accelerated growth of the digital economy, especially in developing countries like Indonesia.<sup>19</sup> However, behind the glittering benefits, there

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<sup>16</sup> Beltsazar Arya Krisetya, "Membangun Masa Depan Digital Indonesia: Perkembangan Terbaru Regulasi Teknologi," *Tech For Good Institute* (blog), October 7, 2024, <https://techforgoodinstitute.org/uncategorized/membangun-masa-depan-digital-indonesia-perkembangan-terbaru-regulasi-teknologi/>.

<sup>17</sup> Arditya, Nugraha, and Nugraha, "RUU PDP Belum Penuhi Standar Internasional Perlindungan Data Pribadi."

<sup>18</sup> Christine and Kansil, "Hambatan Penerapan Perlindungan Data Pribadi Di Indonesia Setelah Disahkannya Undang-Undang Nomor 27 Tahun 2022 Tentang Perlindungan Data Pribadi."

<sup>19</sup> Hendra Kusuma and Wiwiek Kusumaning Asmoro, "Perkembangan Financial Teknologi (Fintech) Berdasarkan Perspektif Ekonomi Islam," *Istithmar* 4, no. 2 (December 1, 2020), <https://doi.org/10.30762/istithmar.v4i2.14>.

is a legal dilemma that is no less complex. On the one hand, AI and fintech promise unprecedented ease and speed of service; but on the other hand, they also have the potential to erode fundamental individual rights, such as the right to privacy, data security, and even legal certainty itself. For example, the use of AI in generating content—whether in the form of text, images, or voices—blurs the line between human and machine creators, raising serious questions about who owns the copyright to the work, and who is responsible if the content produced violates the law or ethics. Not to mention the algorithms in fintech that are often not transparent can risk discriminating against or excluding certain users. Unfortunately, Indonesia's current legal framework is not yet fully capable of reaching or understanding these dynamics in their entirety. Existing laws and regulations still lag behind the pace of technological development, are often reactive, sectoral, and not yet sufficiently adaptive to the cross-border and multifunctional nature of digital technology. Therefore, a legal approach is needed that is not only based on certainty and clarity of norms, but also flexible, responsive to change, and open to the principles of global technological ethics. Future regulations must be able to bridge innovation and protection of rights, between efficiency and justice, and between economic and humanitarian progress.

### **3.1.5. Jurisdictional Complexities in Cyber and International Law**

Cybercrime is a global legal challenge that fundamentally shakes the classic principles of jurisdiction that have so far been based on national territorial boundaries.<sup>20</sup> In a cyber world without geographical barriers, criminals can operate from country A, target victims in country B, and utilize digital infrastructure such as servers spread across country C. This complexity not only complicates the process of identifying and tracking perpetrators, but also presents major problems in terms of cross-border law enforcement. Differences in legal systems, levels of regulatory progress, and priorities for handling digital crime in each country often cause countermeasures to be hampered by a lack of synchronization of approaches and limited legal authority. Amid these challenges, the Budapest Convention on Cybercrime adopted by the Council of Europe in 2001 is present as one of the most comprehensive multilateral instruments in encouraging international cooperation, regulatory harmonization, and information exchange between countries in dealing with cybercrime.<sup>21</sup> However, until now, Indonesia has not ratified the convention, which means it has not formally integrated itself into a broader and more coordinated international cooperation system. The absence of an international legal umbrella places Indonesia in a vulnerable position in dealing with cross-border cybercrime, both in terms of prevention, investigation, and extradition of perpetrators. Therefore, strategic steps such as ratifying the Budapest Convention, aligning national regulations with international standards, and strengthening the capacity of law enforcement institutions in the field of digital forensics and international legal diplomacy are very

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<sup>20</sup> Jhos Franklin Kemit, Vanya Agatha H, and Kristoforus Laga Kleden, "Yurisdiksi Kejahatan Siber: Borderless," *Seminar Nasional - Hukum Dan Pancasila 2* (July 29, 2023): 55–70, <https://conference.untag-sby.ac.id/index.php/snhp/article/view/2414>.

<sup>21</sup> Dr Budiyanto S. H., *Pengantar Cybercrime dalam Sistem Hukum Pidana di Indonesia* (Banten: Sada Kurnia Pustaka, 2025).



urgent in order to maintain Indonesia's legal sovereignty amidst the increasingly complex reality of the cyber world that is not limited by map lines.

### **3.1.6. Lack of Independent Institution for Personal Data Protection**

The Personal Data Protection Law (PDP Law) marks an important milestone in the history of Indonesia's digital legislation, but the appointment of the Ministry of Communication and Information (Kominfo) as the main supervisory authority raises concerns that cannot be ignored. One of the main criticisms that has emerged concerns institutional independence, because Kominfo is part of the executive that is structurally under the control of the government.<sup>22</sup> This condition opens up space for conflicts of interest, especially when the government also acts as a manager and user of personal data in various digital-based public services. In fact, global practice shows that in order to ensure effective, credible supervision, and freedom from political and economic pressure, the personal data protection authority should be in the form of an independent institution such as *the Data Protection Authority (DPA)* in the European Union, which operates autonomously and has full authority in supervision, investigation, and sanctioning.<sup>23</sup> The absence of a similar institution in Indonesia has the potential to erode public trust in the seriousness of the state in protecting the privacy rights of its citizens, as well as complicate cross-country cooperation on the issue of cross-jurisdictional data exchange, especially with countries that adopt the principle of "adequacy decision" as applied in the European Union's General Data Protection Regulation (GDPR).<sup>24</sup> Without guarantees of independent supervision, Indonesia could lag behind in global digital integration, experience rejection in international data cooperation, and increase the risk of systemic personal data breaches. Therefore, institutional strengthening through the establishment of an independent, fully authorized, and accountable supervisory body is an urgent need to make the PDP Law not only a symbol of legislative progress, but also a real instrument for protecting digital rights in the information era.<sup>25</sup>

### **3.1.7. The Need for Legal Harmonization and International Cooperation**

In facing the complexity of legal challenges in the rapidly developing and cross-border digital era, Indonesia can no longer rely solely on a fragmented and locally nuanced legal framework.<sup>26</sup> Strategic and measured steps are needed in the form of

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<sup>22</sup> Arditya, Nugraha, and Nugraha, "RUU PDP Belum Penuhi Standar Internasional Perlindungan Data Pribadi."

<sup>23</sup> Azza Fitrahul Faizah et al., "Penguatan Pelindungan Data Pribadi Melalui Otoritas Pengawas Di Indonesia Berdasarkan Perbandingan Hukum Hong Kong Dan Singapura," *Hakim: Jurnal Ilmu Hukum Dan Sosial* 1, no. 3 (June 28, 2023): 01–27, <https://doi.org/10.51903/hakim.v1i3.1222>.

<sup>24</sup> Ibid.

<sup>25</sup> Yusuf Daeng et al., "Perlindungan Data Pribadi Dalam Era Digital: Tinjauan Terhadap Kerangka Hukum Perlindungan Privasi," *Innovative: Journal Of Social Science Research* 3, no. 6 (November 30, 2023): 2898–2905, <https://j-innovative.org/index.php/Innovative/article/view/6662>.

<sup>26</sup> Ahmad Ahmad, "Measuring The Application of Corporate Social Responsibility of PT. Gorontalo MineralS," *Estudiante Law Journal* 4, no. 2 (February 15, 2022): 132–45, <https://doi.org/10.33756/eslaj.v4i2.16489>; Nurhayati Manto, Erman I. Rahim, and Ahmad Ahmad, "Implementasi Pasal 32 Peraturan Daerah Kabupaten Gorontalo Nomor 1 Tahun 2024 Tentang Pajak Daerah Dan Retribusi Daerah," *Sinergi: Jurnal Riset Ilmiah* 2, no. 1 (January 7, 2025): 33–44,

harmonizing national laws with international standards so that Indonesia is not isolated in the global digital ecosystem. This harmonization includes the ratification of various relevant international conventions – such as the Budapest Convention on Cybercrime and global personal data protection instruments – which can become the basis for legitimacy for transnational cooperation in law enforcement and data exchange. Furthermore, the establishment of an independent personal data protection institution that is free from political and economic intervention is a necessity to ensure objective, transparent, and credible supervision of digital data management. At the same time, strengthening the capacity of law enforcement officers, from investigators to prosecutors and judges, is essential so that they are able to understand, anticipate, and respond to increasingly sophisticated and difficult-to-track digital crime modes. Without these systemic efforts, Indonesia will be in a vulnerable position – both in terms of protecting its citizens' digital rights and in maximizing the potential of the digital economy which is expected to be one of the drivers of national growth in the future.<sup>27</sup> The lack of legal synchronization also risks creating regulatory imbalances that can be exploited by international cybercrime actors, as well as reducing global investor confidence in Indonesia's commitment to maintaining security and legal certainty in cyberspace. Therefore, a legal vision is needed that is not only based on national realities, but also reaches global dynamics with a collaborative, adaptive, and progressive spirit.

### **3.2. Solutions in Facing Legal Challenges in the Digital Era**

#### **3.2.1. Progressive and Adaptive Digital Legislative Reform ( *Agile Lawmaking* )**

In the face of rapid technological change, the concept of *Agile Lawmaking* has become an inevitable necessity to ensure that regulations remain relevant, adaptive, and responsive to the dynamics of the times. Traditional legislation that is static, bureaucratic, and slow is now considered less able to anticipate the complexity and speed of digital innovation. Agile Lawmaking offers a new approach that adopts iterative, responsive, and participatory principles, similar to the agile methods that have long been used in software development. Through this approach, legislation moves flexibly, with room for continuous learning and adjustments based on field conditions. One of the main pillars of this approach is the preparation of regulations based on real-time data or *evidence-based legislation*, where legislative decisions are not only based on assumptions or momentary political interests, but are supported by accurate data that is continuously updated. This evidence-based approach allows the resulting regulations to be more precise, solution-oriented, and based on the real needs of the community.<sup>28</sup>

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<https://doi.org/10.62335/y2rtss89>; Ahmad Ahmad and Novendri M. Nggilu, *Constitutional Dialogue : Menguatkan Intraksi Menekan Dominasi (Konvergensi Terhadap Pengujian Norma Di Mahkamah Konstitusi)* (Yogyakarta: UII Press, 2023).

<sup>27</sup> Kemit, H, and Kleden, "Yurisdiksi Kejahatan Siber."

<sup>28</sup> Dewi Sartika Mokoagow, "Abusive Law Making (Analisis Penurunan Partisipasi Publik Dalam Proses Pembentukan Undang-Undang)," *Journal of Innovation Research and Knowledge* 4, no. 7 (December 8, 2024): 4733–48, <https://bajangjournal.com/index.php/JIRK/article/view/9124>.

Furthermore, Agile Lawmaking also encourages **periodic regulatory improvements** through concepts such as *regulatory sprints* or regulatory iterations. This means that regulations are not considered final once they are passed, but must be evaluated and updated periodically in certain time cycles, so that regulations remain relevant to changes in the social, economic, and technological context. This process also opens up space for **dynamic public involvement** through various digital platforms, so that the public can contribute directly by providing input, identifying implementation problems, or even proposing regulatory updates. Through the use of technology, public participation is no longer passive or elitist, but becomes broader, more inclusive, and real-time.<sup>29</sup> Thus, *Agile Lawmaking* not only accelerates the legislative process, but also improves the quality of the resulting law, strengthens its social legitimacy, and reduces the distance between the state and citizens in this digital era.

### 3.2.2. Application of Legal Tech ( *Legal Tech*, *Smart Contracts* )

The application of *Legal Tech* and *Smart Contracts* has great potential in making a fundamental transformation of legal governance and contracts in the digital era. With the integration of technologies such as *blockchain notarization*, transparency in various legal transactions can be significantly improved. Every step in the legal process can be recorded in an immutable blockchain network, creating a publicly verifiable audit trail, while minimizing the risk of data manipulation. In addition, the use of Smart Contracts has great potential **to reduce transaction costs** in the implementation of public contracts, such as government procurement of goods and services. Through code-based contract execution automation, many manual administrative processes that were previously time-consuming and costly can be eliminated, increasing efficiency and reducing the opportunity for irregularities or corruption. In addition, Smart Contracts offer **automatic legal certainty ( *predictability* )**, because the terms and consequences of the agreement have been clearly programmed, and will be executed automatically once the agreed conditions are met, without the need for manual intervention or additional interpretation.<sup>30</sup>

Concrete examples of the application of Legal Tech can be seen from various innovations that are now being adopted in the public and private sectors. One example is the use of **automated compliance tools** to facilitate the implementation of regulations such as **the General Data Protection Regulation (GDPR)** in the European Union. These tools help organizations automatically monitor and ensure that all personal data processing activities comply with strict data protection standards, reducing the risk of legal sanctions due to non-compliance. In the land sector, **blockchain-based land registration innovations** have begun to be introduced in various countries to create a more transparent, secure, and forgery-resistant land

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<sup>29</sup> Akhmad Zaki Yamani, "Legal Drafting Untuk Perubahan Hukum: Tantangan Dan Solusi Dalam Penyusunan Regulasi Dan Undang-Undang Yang Adaptif," *Journal of Law and Nation* 3, no. 4 (August 31, 2024): 1026–36, <https://jnl.my.id/index.php/jnl/article/view/19>.

<sup>30</sup> Aaron Wright and Primavera De Filippi, "Decentralized Blockchain Technology and the Rise of Lex Cryptographia," SSRN Scholarly Paper (Rochester, NY: Social Science Research Network, March 10, 2015), <https://doi.org/10.2139/ssrn.2580664>.

registration system.<sup>31</sup>With this system, land ownership certificates are stored on the blockchain, thereby accelerating the property transaction process, reducing ownership conflicts, and increasing public trust in land administration. All of this indicates that collaboration between law and technology is not just a momentary trend, but a strategic need to build a more adaptive, transparent, and equitable legal system in the future.

### 3.2.3. Improving Digital Legal Literacy for the Community and Law Enforcement Officers

Traditional legal education now faces a major challenge to adapt to the new realities of the digital world. The legal curriculum, which has so far focused on classical norms such as civil, criminal, and administrative law, needs to be immediately expanded with materials that cover *cyber law*, personal data protection, and artificial intelligence ethics ( *AI ethics* ). Understanding the legal framework governing cyberspace is essential, given the many crimes, privacy violations, and ethical uncertainties that arise from technological developments. In addition, in the context of law enforcement, it is very important to improve the capabilities of law enforcement officers, including police, prosecutors, and judges, in understanding, identifying, and evaluating digital evidence. Evidence in the form of data logs, metadata, server recordings, and blockchain transaction traces requires technical expertise that is not obtained through conventional legal education.<sup>32</sup>Therefore, modern legal education must also be designed to empower the community through public awareness campaigns *about* their digital rights, such as the right to data privacy, the right to cybersecurity, and the right to access and use information freely and responsibly.

In an effort to build this capacity, various innovative digital legal education program models need to be developed and expanded. One effective model that can be implemented is *Digital Law Clinics*, where law students can learn directly to handle real cases related to legal issues in the digital realm, such as data privacy violations, cyberbullying, or electronic transaction disputes. This program allows for the development of practical competencies while accelerating the transfer of digital legal knowledge into everyday legal practice. In addition, the implementation of *Massive Open Online Courses (MOOCs)* on various aspects of digital law can be an effective strategy to expand access to modern legal education to a wider audience. Through this online platform, not only law students, but also practitioners, state apparatus, and the general public can access the latest digital legal materials flexibly and affordably.<sup>33</sup>With this approach, the legal education ecosystem will be more inclusive, adaptive

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<sup>31</sup> Primavera De Filippi and Aaron Wright, *Blockchain and the Law: The Rule of Code* (Cambridge, Massachusetts: Harvard University Press, 2018), <https://doi.org/10.2307/j.ctv2867sp>.

<sup>32</sup> Richard Susskind and Richard Susskind, *Online Courts and the Future of Justice* (Oxford, New York: Oxford University Press, 2019).

<sup>33</sup> Daniel Martin Katz, "Quantitative Legal Prediction – or – How I Learned to Stop Worrying and Start Preparing for the Data Driven Future of the Legal Services Industry," SSRN Scholarly Paper (Rochester, NY: Social Science Research Network, December 11, 2012), <https://papers.ssrn.com/abstract=2187752>.

to technological changes, and able to produce a generation of digital jurists who are ready to oversee legal developments in the era of the industrial revolution 4.0 and beyond.

### 3.2.4. Comparative Study: Estonia and Singapore

Estonia and Singapore are often considered two of the world's best models for integrating digital technology into their legal and government systems. Both demonstrate how digital innovation can accelerate public service delivery, increase transparency, and build public trust in the state. Estonia, as a pioneer in digital governance, has implemented mandatory *e-Residency* , allowing anyone in the world to have an Estonian digital identity and access a range of business and government services. Singapore, on the other hand, has developed the *Smart National ID* , a smart identity card integrated with government, healthcare, and banking services. In terms of digital legislation, Estonia has developed the *X-Road Data Exchange Legislation* , which provides a foundation for secure, fast, and encrypted data exchange between state institutions, enabling full interoperability between agencies. Singapore has responded with the *Smart Nation Initiatives* , an umbrella policy that addresses the use of technology in everyday life, including data governance, smart transportation, and digital healthcare.

Furthermore, Estonia has also built an E-Court system that allows the judicial process to be carried out online from case registration, trials, to execution of decisions, while Singapore operates the *Community Justice Center* , which provides community-based judicial services using technology to accelerate the resolution of small disputes. In terms of legal approach, Estonia applies the principle of *high flexibility and citizen-centered* , where digital regulations are made with high flexibility and always focus on the interests and convenience of citizens. In contrast, Singapore uses a tech regulation " *sandboxes* " approach, where new technologies are tested in a controlled legal environment before being widely implemented. This approach allows innovation to thrive while maintaining public safety and regulatory stability. Overall, Estonia and Singapore demonstrate that successful digital transformation of law and government requires strategic vision, courage in innovation, and an adaptive and responsive legal framework.

Here is a brief table to clarify the comparison:

Aspect	Estonia <sup>34</sup>	Singapore <sup>35</sup>
Digital Identity	Mandatory e-Residency	Smart National ID
Digital Legislation	X-Road Data Exchange Legislation	Smart Nation Initiatives

<sup>34</sup> Tarmo Kalvet, "Innovation: A Factor Explaining e-Government Success in Estonia," *Electronic Government, an International Journal* 9, no. 2 (January 2012): 142–57, <https://doi.org/10.1504/EG.2012.046266>.

<sup>35</sup> Smart Nation, "Frameworks and Blueprints," 2024, <https://www.smartnation.gov.sg/frameworks-and-blueprints/>.

Digital Court	E-Court System	Community Justice Center
Agile Legal Approach	High flexibility and citizen-centered	Tech regulation "sandboxes"

## 5. Conclusion

The rapid development of digital technology in Indonesia has revealed a variety of complex legal challenges, including inconsistent regulations prior to the enactment of the Personal Data Protection Law, legislation lagging behind technological innovation, fragmentation of regulatory institutions with overlapping authorities, the dilemma between encouraging innovation and protecting individual rights, and the complexity of jurisdiction in international cyber law. To address these challenges, comprehensive legal reform, the establishment of an independent institution for personal data protection, harmonization of regulations between institutions, and increased international cooperation in cyber law enforcement are needed. These steps are important to ensure that the Indonesian legal system can adapt to the dynamics of digital technology, protect individual rights, and support the sustainable growth of the digital economy.

In facing the rapidly changing digital era, the concept of Agile Lawmaking, the application of Legal Tech and Smart Contracts, and digital legal education reform are the keys to building an adaptive and responsive legal system. Agile Lawmaking encourages real-time data-based legislation, regulatory iteration, and dynamic public participation, while Legal Tech increases transparency, reduces transaction costs, and provides automatic legal certainty through innovations such as blockchain and automated compliance tools. Legal education must also evolve, introducing cyber law, data protection, and AI ethics, as well as strengthening the ability of law enforcement officers to handle digital evidence. Estonia and Singapore are the world's best models, with innovations such as e-Residency, Smart National ID, E-Court, and regulatory sandboxes that show how a visionary and flexible digital legal approach can improve the effectiveness of the law while strengthening public trust in the era of advanced technology.

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