



LEGAL TRANSFORMATION IN RESPONDING TO TECHNOLOGICAL DISRUPTION: REMEASURING LEGAL SOVEREIGNTY IN THE DIGITAL ERA

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Abstract

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The development of digital technology has brought significant disruption in the social, economic, and legal order. This article analyzes how countries can maintain and transform their rule of law in the face of an increasingly complex, borderless digital era. Through a juridical-normative approach, challenges to the rule of law due to the emergence of digital entities, algorithmic power, and jurisdictional crossing by global platforms are discussed. The article also emphasizes the importance of substantial, institutional, and cultural legal transformation to build an adaptive and inclusive legal system. The idea of digital sovereignty, data protection, and the regulation of artificial intelligence was raised as part of a strategy to strengthen the state's role in ensuring justice and human rights in the digital world. In conclusion, legal transformation is necessary for the state to maintain its authority amid the rapid development of digital technology.

A. Introduction

The development of digital technology has entered a phase of disruption that radically changes the face of social, economic, political, and legal life. Disruption no longer means only disruption of the old order, but also the formation of new realities that challenge old ways of thinking and acting, including within the national legal system.¹ Countries around the world, including Indonesia, are facing immense pressure to respond to this transformation quickly, appropriately, and adaptively.

The presence of digital technologies such as artificial *intelligence* (AI), *blockchain*, *Internet of Things* (IoT), and cloud technology has created models of social interaction that are no longer limited by space and time. Conventional legal concepts such as jurisdiction, legal subjects, and evidence face new complexities in their application.² On the one hand, technology enhances law enforcement effectiveness. Still, on the other hand, it creates risks of data leaks, cross-border cybercrime, and algorithmic inequality in the hands of a handful of global corporations.³ Within this framework, the state, as the holder of national legal sovereignty, is

¹ Widodo Dwi Putro, 'Disrupsi Dan Masa Depan Profesi Hukum', Old Website Of Jurnal Mimbar Hukum, 32.1 (2020), Pp. 19–29, Doi:10.22146/Jmh.42928.

² Program Studi And Others, 'Kedaulatan Negara Dalam Hukum Internasional', *Jurnal Pacta Sunt Servanda*, 3.2 (2022), Pp. 32–41 <<https://ejournal2.undiksha.ac.id/index.php/jpss/article/view/1412>>.

³ Hans Kelsen, "General Theory Of Law And State", *Diterjemahkan Oleh Rasisul Muttaqien*, (Nusa Media., 2011).

challenged to reaffirm its role as a protector of citizens' rights and a controller of the negative impact of technological advances.⁴ The question is: to what extent can national law regulate cross-border digital entities and activities that lack a clear physical form? Are the state's legal tools still capable of guaranteeing the principles of justice, certainty, and usefulness in this highly fluid digital era?

Furthermore, the state is not only tasked with creating new regulations but also required to carry out institutional and cultural transformations in law enforcement.⁵ Legal sovereignty is no longer enough to be interpreted as supremacy over territory; it now also includes "data sovereignty", "algorithm sovereignty", and "digital sovereignty". The state's inability to manage these aspects will lead to a shift in legal authority driven by market and technological forces.

Thus, legal transformation is no longer an option, but a necessity in responding to the new reality of the digital state. This article analyzes how the state can affirm its sovereignty through adaptive and progressive legal transformation, without losing the essence of justice or the protection of human rights. How does technological disruption affect the country's legal sovereignty? And what are the legal transformation strategies that can be pursued to maintain the relevance and effectiveness of the law in the digital era?

B. Discussion

1. Technological Disruption: A Challenge to the Rule of Law

Digital transformation, characterized by the revolution in information and communication technology, has shifted the traditional geographical boundaries that underpin the national legal system. Technological disruption creates a new reality that is no longer limited by space and time. Hence, national laws based on the principle of territoriality face limitations in responding to phenomena such as cross-border transactions, data control by global corporations, and transnational cybercrime.⁶

In this context, the legal sovereignty of the state is tested not only in control over territory but also in control over the flow of information and data. Countries lose control over the digital ecosystem when the digital activities of their citizens are managed by global platforms such as Google, Meta (Facebook), Amazon, or TikTok that are outside the national jurisdiction.⁷ This phenomenon creates a legal vacuum and weakens the state's capacity to protect its citizens' interests.⁸

Moreover, the algorithms used by global digital entities have regulated citizens' social behavior, consumption, and even political opinions. In some cases, the power of algorithms even exceeds that of

⁴ 'Tantangan Profesi Hukum Dalam Melindungi Hak Cipta Sebagai Jaminan Kredit Perbankan Di Era Digital | Christy | Jurnal Rechts Vinding: Media Pembinaan Hukum Nasional'

<<https://Rechtsvinding.Bphn.Go.Id/Ejournal/Index.Php/Jrv/Article/View/1800>> [Accessed 22 April 2025].

⁵ Amanda Eugenia Soeliongan, 'Urgensi Peraturan Bioterrorisme Di Indonesia Dalam Perspektif Hak Asasi Manusia (The Urgency Of Bioterrorism Regulations In Indonesia On Human Rights Perspective)',

Doi:10.30641/Ham.2020.11.169-184; Degradasi Moral And Others, 'Degradasi Moral Siswa-Siswi Dalam Penerapan Nilai Pancasila Ditinjau Dari Pendidikan Kewarganegaraan Sebagai Pendidikan Karakter', *Jurnal Moral Kemasyarakatan*, 8.1 (2023), Pp. 24-36, Doi:10.21067/Jmk.V8i1.8278.

⁶ A Kadriah, D Sumarna - Supremacy Of Law (Ilmu Hukum), And Undefined 2024, 'Analisis Epistemologi Kritis Terhadap Metode Penelitian Hukum Perdata', *Ojs.Kayyismulajaya.Org*

<<https://Ojs.Kayyismulajaya.Org/Index.Php/Hukum/Article/View/30>> [Accessed 22 April 2025]; Wilda Malika Mufrihah And Nandang Najmudin, 'Transformasi Hukum Dagang Internasional Di Era Teknologi Blockchain Dan Cryptocurrency', *Ikraith-Ekonomika*, 7.3 (2024), Pp. 382-96, Doi:10.37817/Ikraith-Ekonomika.

⁷ Nur Khalimatus, Sa 'Diyah, And Ria Tri Vinata, 'Rekonstruksi Pembentukan National Cyber Defense Sebagai Upaya Mempertahankan Kedaulatan Negara' <<http://Nasional.Kompas.Com/>> [Accessed 22 April 2025].

⁸ Purna Cita Nugraha, 'Pembentukan Prinsip Jurisdiction To Prevent (Pre-Emptive Jurisdiction) Dan Prinsip Perlindungan Aktif Dalam Hukum Siber', *Jurnal Bina Mulia Hukum*, 3.1 (2018), Pp. 43-60, Doi:10.23920/Jbmh.V3n1.4.

legislators in shaping people's lives. This situation underscores the urgency of reconceptualizing legal sovereignty to encompass data and digital *sovereignty*.⁹

Technological disruption also gives rise to new entities that are not defined within the classical legal framework, such as digital assets (e.g., *crypto assets*), virtual identities, and algorithmic *entities*. In addition, state authorities face challenges supervising digital economy activities such as e-commerce, crypto transactions, and blockchain-based financial services, which often operate across borders and without official permission.¹⁰

This shows that national laws are increasingly challenging to keep up with the complex and dynamic digital reality. When digital activities no longer recognize territorial jurisdiction, state sovereignty in establishing, implementing, and enforcing laws experiences existential challenges. Without an update on the legal strategy, the state can slip into a spectator role in a digital arena dominated by non-state actors.

Therefore, the redefinition of the rule of law needs to be carried out conceptually and practically. Conceptually, sovereignty must be interpreted as the state's ability to ensure legal justice not only in the physical space but also in the digital space. In practice, the state must build a legal framework and digital infrastructure capable of reaching and regulating the digital behavior of its citizens and foreign entities operating in Indonesia's virtual territory.

Concepts such as extraterritorial jurisdiction, data localization, and the principles of good digital governance must be a firm foundation for formulating future national legal strategies. Without this, the country will continue to lag in an increasingly competitive and risky digital race for human rights, national security, and the integrity of the law itself.

2. Legal Transformation: Its Need and Urgency

Legal transformation is a pressing need to address the challenges posed by digital technology disruption, not only in response to regulatory complexity, but also as a strategic effort by the state to maintain the relevance of national law in the ever-changing global order. Technological disruption cannot be addressed with just the old legal logic; instead, it requires innovation in legal theory, methods, and practice.¹¹

Legal transformation should not be limited to the formation of new norms but should encompass systemic changes across the entire legal ecosystem, including the substance, institutional structure, and legal culture. All three must be developed simultaneously and synergistically so that the transformation is not partial and patchy.

a. Renewal of Legal Substance

The substance of the law that exists today is generally still formulated in an analog framework, making it challenging to anticipate digital phenomena.¹² In the digital world, new legal entities such as smart contracts, digital identities, and blockchain-based organizations (DAOs) have emerged, which cannot be explained within traditional legal frameworks. Therefore, a thorough codification and decodification of the new law is needed.

⁹ Arpita Agnihotri And Others, 'Examining Social Media Engagement Through Health-Related Message Framing In Different Cultures', *Journal Of Business Research*, 152 (2022), Pp. 349–60, Doi:10.1016/J.Jbusres.2022.08.005.

¹⁰ Mohammad Fadel Roihan Ba'abud, 'Penerapan Prinsip Yurisdiksi Ekstrateritorial Terhadap Pelaku Tindak Pidana Pencurian Data Pribadi Yang Dilakukan Secara Lintas Batas Negara' 2023, 2023 <<https://Dspace.Uii.Ac.Id/Handle/123456789/46567>>.

¹¹ N Budi And Arianto Wijaya, 'Peranan Teori Hukum Pada Peradapan Digital Revolusi Industri 4.0', *Jurnal Kewarganegaraan*, 7.2 (2023), Pp. 2571–85, Doi:10.31316/Jk.V7i2.5882; Putro, 'Disrupsi Dan Masa Depan Profesi Hukum'.

¹² Ahmad Fariz Sabili, Aqila Bagus Misbahuddin, And I Putu Naratama Wira Chandra, 'Implementasi Blockchain Pada Pemadanan Nik Dan Npwp Sebagai Langkah Nyata Optimalisasi Keamanan Data Wajib Pajak Di Era Society 5.0', *Jurnal Pajak Indonesia (Indonesian Tax Review)*, 7.2 (2023), Pp. 25–32, Doi:10.31092/Jpi.V7i2.2470.

Example:

1. The concept of criminal liability for artificial intelligence systems (*AI liability*) needs to be explicitly regulated, including limits on producer and user liability.
2. Regulations on digital asset transactions should include oversight of the crypto market and DeFi (Decentralized *Finance*) technology.
3. Personal data protection is not enough only from an administrative perspective, but needs to be strengthened as a digital human right that is equivalent to conventional privacy rights.

Legal substantive reform must also follow a "technology-neutral regulation" approach, establishing legal norms that are adaptable to any technology without requiring changes to the law every time technology evolves.

b. Institutional Restructuring

Legal transformation will not occur unless it is supported by structural reforms to legal institutions and law enforcement. Institutions such as the police, prosecutor's office, and judiciary must adopt digital technology across administration, investigation, trial, and law enforcement.

Strengthening the e-Government and e-Court systems is essential to creating an efficient and transparent digital legal system.¹³ In addition, new institutions or special units such as:

- 1) Algorithm Ethics Agency to oversee the use of AI in public services and the private sector;
- 2) the Digital Rights Protection Commission to deal with violations of citizens' digital rights;
- 3) Integrated Cyber Unit between ministries/agencies for rapid handling of digital crimes.

Legal institutions must also create a more intensive space for international cooperation to harmonize digital regulations. Without this, national law will always be reactive to global policy.

3. Shifting Legal Culture

Indonesia's legal culture still faces significant challenges in navigating the digital reality. Many law enforcement officials lack the technical competence to understand the architecture of digital systems, such as blockchain, encryption, or machine learning. This affects the difficulty of effectively enforcing the law in digital crime cases.¹⁴

The public still has low digital legal literacy. Many citizens do not understand their rights to personal data or how to protect themselves from digital crimes such as phishing, deepfakes, and online scams.¹⁵

The transformation of legal culture must start with legal education reform. The law faculty must integrate courses such as technology law, cyberlaw, data protection law, and digital ethics into the curriculum as core components.

In addition, legal training institutions need to update their training methods, incorporate simulation technology (legal tech tools) and online learning management systems, and collaborate with digital industry practitioners.

¹³ Hani Adhani And Perjalanan Artikel, 'Mahkamah Konstitusi Indonesia Di Era Digital: Upaya Menegakan Konstitusi, Keadilan Substantif Dan Budaya Sadar Berkonstitusi', *Jurnal Penegakan Hukum Dan Keadilan*, 2.2 (2021), Pp. 130–46, Doi:10.18196/Jphk.V2i2.11763.

¹⁴ Reno Andre Permana And Others, 'Analisis Metode Dan Teknologi Untuk Perlindungan Data Dan Informasi Dari Ancaman Siber', *Jurnal Mentari: Manajemen, Pendidikan Dan Teknologi Informasi*, 3.2 (2025), Pp. 137–46, Doi:10.33050/Mentari.V3i2.744.

¹⁵ Ni Nyoman And Others, 'Pembelajaran Era Disruptif Menuju Era Society 5.0 (Telaah Perspektif Pendidikan Dasar)', *Prosiding Seminar Nasional Iahn-Tp Palangka Raya*, No. 1 (2020), Pp. 1–14, Doi:10.33363/Sn.V0i0.32.

By building a digitally literate legal culture, the state will have strong resilience and adaptability in managing disruption, as well as being able to instill legal values in an inclusive and democratic digital ecosystem.

b. Remeasuring the Rule use of AI in the judicial system. In the private sector, AI is used in a variety of industries, from banking to e-commerce to healthcare. However, while AI offers great innovation potential, it can also pose challenges related to algorithmic bias, discrimination, and a lack of transparency in automated decision-making. Therefore, the state needs to strictly regulate the use of AI and ensure that these technological systems remain accountable and do not violate individual rights.

c. Technology Transparency and Accountability

Openness and accountability are essential elements in maintaining the rule of law in the digital space. Technological systems, especially those used by large corporations or governments, must be accountable by the authorities. Countries need to ensure that technology companies and other digital service providers not only follow applicable legal regulations but also adhere to the principles of transparency in terms of data use policies, AI-related decision-making, and oversight of digital systems.

2. A "Regulatory Sandbox" Approach to Digital Innovation

To maintain a balance between strict regulation and room for innovation, approaches such as a "regulatory sandbox" can be the solution.¹⁶ This model allows companies or startups to test their digital products or services in a limited space, under state supervision, before being implemented more widely. The goal of this model is to create a safe environment for innovation while ensuring that the piloted technology does not harm society.¹⁷

A successful example of regulatory sandbox implementation can be seen in Indonesia's fintech sector. The Financial Services Authority (OJK) has implemented this kind of regulation for the financial technology sector, providing fintech companies with a space to test their products before launching them to the market.¹⁸ This approach has proven effective in reducing legal risks and ensuring that digital innovations by fintech companies remain compliant with state standards.

This approach can also be extended to other sectors such as healthtech, edutech, and artificial intelligence. In the healthtech industry, for example, startups focused on health technology can be tested in a more controlled environment, with oversight of medical data privacy and user security. Similarly, in the edutech sector, limited space to test educational technology products can ensure that the platform does not violate national education regulations and operates ethically.¹⁹

3. Cross-Border Legal Interoperability Policy

The digital era requires countries to adopt policies that address cross-border interactions. Indonesian citizens, for example, often interact with digital platforms based abroad, such as Facebook, Google, or

¹⁶ Kristin Kartini And Others, 'Tinjauan Yuridis Regulatory Sandbox Terhadap Mekanisme Teknologi Finansial (Fintech) Di Indonesia', *Jurnal Hukum Patik*, 9.2 (2020), Pp. 114–24, Doi:10.51622/Patik.V9i2.237.

¹⁷ Niluh Martiniasih And Deli Bunga Saravistha, 'Harmonisasi Kewenangan Bank Indonesia Dan Otoritas Jasa Keuangan Terkait Penerapan Regulatory Sandbox Dalam Inovasi Berbasis Fintech Di Indonesia', *Jurnal Indonesia Sosial Teknologi*, 3.8 (2022), P. 837, Doi:10.36418/Jist.V3i8.473.

¹⁸ Aji Baskoro Fakultas Hukum, Universitas Gadjah Mada Jl Sosio Yustisia Bulaksumur No, And Karang Malang, 'Transformasi Kualitas Legislasi: Regulatory Sandbox Sebagai Sarana Partisipasi Publik Dan Evaluasi Dalam Pembentukan Peraturan Perundang-Undangan', *Jurnal Rechts Vinding: Media Pembinaan Hukum Nasional*, 13.3 (2024), P. 2024, Doi:10.33331/Rechtsvinding.V13i3.1956.

¹⁹ 'Retorika: Teori Dan Teknik Praktis Seni Berbicara Di Era Digital - Relly Anjar Vinata Wisnu Saputra, S.I.Kom., M.I.Kom. - Google Books'

<https://books.google.co.id/books?hl=en&lr=&id=Yx_5eaaqbaj&oi=fnd&pg=Pa8&dq=Kedaulatan+Hukum+Dalam+Era+Digital:+Lebih+Dari+Sekadar+Wilayah+Geografis&ots=F_Aaf60fnr&sig=Knx3gpyjey5cfj6dfcpejw6eca8&redir_esc=Y#v=Onepage&q&f=false> [Accessed 22 April 2025].

Amazon. Digital activities carried out by Indonesian individuals or companies on these platforms frequently involve data stored on overseas servers or transactions processed outside of Indonesian legal jurisdiction.

For this reason, the state must have a legal interoperability policy that allows the rules in this country to remain in effect even if the digital activity is carried out abroad. This approach can be applied through regional cooperation, such as the ASEAN Digital Masterplan, which aims to harmonize digital regulations between ASEAN member countries or establish a digital legal framework across Asia.²⁰

In addition, countries need to consider applying international principles to digital regulation, as the European Union did with the GDPR. This kind of regulation provides data protection for citizens of a country, even if the digital activity occurs outside the country's jurisdiction.

4. Building the Foundation for a Fair, Inclusive, and Sustainable Digital Space

Legal transformation in the context of digital sovereignty should not be an obstacle to innovation, but rather a basis for creating a more equitable, inclusive, and sustainable digital space.²¹ Proper regulation can create a digital ecosystem that allows the development of new technologies without sacrificing the fundamental rights of its citizens. With a careful, measured approach, the state can ensure that digital innovation aligns with the principles of social justice, human rights, and economic sustainability.²²

It is important to emphasize that these efforts are not only the responsibility of the government, but also the private sector and civil society. All parties must collaborate to create a safe and productive digital space. The state, through policies and regulations, must be a law in a Digital State.

The digital age has changed the basic paradigm of the rule of law. In the past, the rule of law was understood as the state's power over a specific geographical area, encompassing the regulation and supervision of its citizens' activities in physical space. However, with the rapid development of technology, especially related to data, artificial intelligence (AI), and the internet, the rule of law must be understood more broadly.²³ The state not only regulates physical boundaries but also protects the digital rights of its citizens and regulates technologies that affect public life. This article will discuss in more depth the concept of legal sovereignty in the digital era, the approaches that can be applied, and the challenges and opportunities that arise in efforts to build a relevant legal system in the digital world.²⁴

1. Rule of Law in the Digital Age: More Than Just Geographic Territory

The rule of law in a digital state must be understood as the state's ability to regulate and protect various aspects of its citizens' digital lives, not only those that are physical but also those that operate in cyberspace.²⁵ There are a few important elements to keep in mind:

a. Control over Digital Data

²⁰ 'Revolusi Industri 4.0 Di Tengah Society 5.0: Sebuah Integrasi Ruang ... - Halifa Haqqi, Hasna Wijayati - Google Books'

<https://books.google.co.id/books?hl=en&lr=&id=Ce1leaaqbaj&oi=fnd&pg=Pa86&dq=Kedaulatan+Hukum+Dalam+Era+Digital:+Lebih+Dari+Sekadar+Wilayah+Geografis&ots=Jx-3jbojtj&sig=5vuabzrtft84y7r4hxbetbc3twyo&redir_esc=y#v=onepage&q&f=false> [Accessed 22 April 2025].

²¹ 'Penerapan Pancasila Di Dalam Era Digital | Prosiding Seminar Nasional Hukum, Bisnis, Sains Dan Teknologi' <<https://www.ojs.ubb.ac.id/index.php/hubisintek/article/view/3457>> [Accessed 22 April 2025].

²² 'Penerapan Pancasila Di Dalam Era Digital', *Prosiding Seminar Nasional Hukum, Bisnis, Sains Dan Teknologi*.

²³ 'Pembelajaran Era Disruptif Menuju Era Society 5.0 (Telaah Perspektif Pendidikan Dasar) | Prosiding Seminar Nasional Iahn-Tp Palangka Raya' <<https://prosiding.iahntp.ac.id/index.php/seminar-nasional/article/view/32>> [Accessed 22 April 2025].

²⁴ Hendra Wasaraka, 'Reformasi Hukum Untuk Meningkatkan Partisipasi Publik Dalam Sistem Demokratis', *Sovereignty*, 3.1 (2024), Pp. 8–15 <<https://journal.uns.ac.id/index.php/sovereignty/article/view/999>>.

²⁵ Nyoman And Others, 'Pembelajaran Era Disruptif Menuju Era Society 5.0 (Telaah Perspektif Pendidikan Dasar)'.

One of the main challenges in maintaining the rule of law is controlling the data generated, stored, and processed by various digital platforms. In the digital age, data is a valuable asset, and its regulation can determine whether an individual's privacy rights are protected. Countries must have the capacity to ensure that data generated within their jurisdiction is managed in a manner that complies with the principles of personal data protection.

The importance of these controls is reflected in regulations such as the General Data Protection Regulation (GDPR) in the European Union, which governs the collection and processing of personal data of European citizens by companies, both inside and outside the European territory. Therefore, the state needs to develop regulations that ensure the protection of its citizens' personal data from misuse by foreign platforms operating in the region.

b. Regulation of Algorithms and Artificial Intelligence (AI) Systems

Algorithms and artificial intelligence (AI) systems are playing an increasingly important role in daily life, both in public and private services. In the public sector, the use of AI can include data processing for public policy, the management of state administration, or even the

facilitator for technological developments, but also a guardian that ensures that these developments do not harm public welfare.²⁶

C. Conclusion

The digital era has fundamentally changed the legal landscape. The state is no longer limited to regulating within its geographical boundaries; it is also required to be present in the digital space to protect its citizens' rights. Technological disruption presents both challenges and opportunities for national laws to evolve into a more relevant and responsive form. Legal transformation, both in terms of substance, institutional, and legal culture, is a prerequisite for the realization of a fair, adaptive, and sovereign legal system. Legal sovereignty is not only understood as power over territory, but also as control over data, algorithms, and digital infrastructure that shape society's new reality. Therefore, the state must continue to build progressive regulatory capacity to avoid being left behind in global competition, while ensuring that technology remains within the bounds of morality and legal justice.

²⁶ Muhammad Ihsan Dacholfany, 'Peningkatan Kualitas Manajemen Pendidikan Di Sekolah Dasar Melalui Pelatihan Dan Bimbingan', *Community Development Journal : Jurnal Pengabdian Masyarakat*, 5.1 (2024), Pp. 5–13, Doi:10.31004/Cdj.V5i1.23991.

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