

Regulating Artificial Intelligence in Indonesia: Legal Challenges, Ethical Governance, and Policy Harmonization

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Data:

Received: Jan 24, 2025;
Accepted: May 31, 2026;
Published: Jun 16, 2026.

Keywords:

*Artificial Intelligence;
Legal Regulation;
Ethical Governance;
Policy Harmonization.*

Abstract: The rapid development of artificial intelligence (AI) has transformed various sectors in Indonesia, including public services, finance, education, healthcare, and digital commerce. While AI offers significant opportunities for economic growth and technological innovation, its implementation also raises complex legal and ethical challenges related to data protection, algorithmic bias, accountability, transparency, cybersecurity, and human rights. This article examines the regulatory framework governing artificial intelligence in Indonesia and analyzes the extent to which existing laws are capable of addressing emerging technological risks. Using a normative juridical approach combined with a conceptual analysis of ethical governance, the study explores the relationship between national regulations, international AI governance principles, and policy harmonization efforts. The findings demonstrate that Indonesia's current legal framework remains fragmented and sectoral, creating regulatory gaps in the supervision and accountability of AI-based systems. Moreover, ethical governance mechanisms have not been comprehensively institutionalized within public policy and regulatory enforcement. The study argues that effective AI regulation in Indonesia requires an integrated legal framework that balances innovation, legal certainty, public protection, and ethical responsibility. Policy harmonization between national legislation, digital governance institutions, and international standards is essential to ensure responsible, transparent, and human-centered AI development in Indonesia's evolving digital ecosystem.



INTRODUCTION

The rapid advancement of artificial intelligence (AI) has become one of the most transformative developments in the contemporary digital era.¹ AI technologies are increasingly integrated into various sectors, including governance, healthcare, education, transportation, finance, and digital commerce. Through machine learning, big data analytics, and automated decision-making systems, AI offers significant opportunities for improving efficiency, productivity, and innovation. In many countries, AI has also become a strategic instrument for strengthening national competitiveness within the global digital economy. Consequently, discussions concerning AI are no longer limited to technological development alone, but have expanded into legal, ethical, political, and socio-economic dimensions.²

In Indonesia, the growth of AI adoption has accelerated alongside the expansion of digital transformation policies and the increasing use of internet-based services. Government institutions, private corporations, financial technology companies, and e-commerce platforms have begun utilizing AI systems to optimize public services, consumer behavior analysis, cybersecurity mechanisms, and administrative processes. Indonesia's large digital population and rapidly growing technology sector provide substantial opportunities for AI-based innovation. However, the accelerated implementation of AI also generates legal uncertainty due to the absence of comprehensive and specific regulations governing the development and use of AI technologies.³

One of the primary legal challenges in AI governance relates to the issue of accountability and liability. AI systems are capable of making autonomous or semi-autonomous decisions that may significantly affect individuals and society. In situations involving algorithmic discrimination, inaccurate automated decisions, or data misuse, determining legal responsibility becomes increasingly complex. Existing legal frameworks in Indonesia, including laws concerning electronic information, data protection, and consumer protection, have not fully addressed the unique characteristics of AI systems. As a result, there remains a regulatory gap regarding legal accountability for AI-generated outcomes and harms.⁴

In addition to legal accountability, ethical concerns have become central issues in contemporary AI governance discussions. The use of AI technologies frequently raises questions regarding transparency, fairness, privacy, surveillance, and respect for human rights. Algorithmic systems may reproduce social biases embedded within datasets, potentially leading to discriminatory outcomes in areas such as recruitment, financial access, law enforcement, and public services. Ethical governance therefore becomes essential to ensure that AI development remains human-centered and aligned with principles of justice, equality,

¹ Musawer Hakimi, Shuaib Zarinkhail, and Faqeed Ahmad Sahnosh, "Artificial Intelligence and Legal Reform in Developing Countries: Advancing Ethical, Rights-Based, and Accountable Digital Governance," *Jurnal Ilmiah Telsinas Elektro, Sipil Dan Teknik Informatika* 8, no. 2 (September 9, 2025): 127–44, <https://doi.org/10.38043/telsinas.v8i2.6934>.

² Mufidah Mufidah, Hartiwiningsih Hartiwiningsih, and Isharyanto Isharyanto, "Harmonization of Artificial Intelligence (Ai) in Indonesia: Exploration of Technology And Ethics in Islam," *Law and Justice* 9, no. 1 (August 30, 2024): 89–109, <https://doi.org/10.23917/laj.v9i1.5190>.

³ Rustam Tohopi, Yanti Aneta, and Pebriyanto A. Hulinggi, "Artificial Intelligence in Public Governance: Ethical Opportunities and Challenges in Indonesia's Digital Transformation," *Iapa Proceedings Conference*, November 27, 2025, 351, <https://doi.org/10.30589/proceedings.2025.1338>.

⁴ Feri Nugroho, "Artificial Intelligence Regulation and Political Ethics: An Analysis of Indonesia's Position in AI Governance," *Journal of Political Innovation and Analysis* 2, no. 1 (June 2, 2025), <https://doi.org/10.59261/jpia.v2i1.10>.

and public welfare.⁵ Without effective ethical safeguards, technological innovation may create new forms of social inequality and digital exclusion.

Another important issue concerns the protection of personal data within AI ecosystems. AI systems rely heavily on large-scale data collection and processing mechanisms, including personal and behavioral data generated through digital interactions. Although Indonesia has enacted regulations concerning personal data protection, challenges remain regarding implementation, institutional supervision, and cross-sector coordination. The integration of AI technologies into digital platforms increases the risk of data breaches, unauthorized surveillance, and misuse of personal information.⁶ Consequently, regulatory approaches toward AI governance must also incorporate strong data protection principles and cybersecurity mechanisms.

Globally, many countries and international organizations have begun developing regulatory frameworks and ethical standards for AI governance. The European Union, for example, has introduced the AI Act as a risk-based regulatory framework intended to ensure transparency, accountability, and human oversight in AI systems. International organizations such as UNESCO and the OECD have also issued ethical principles emphasizing human rights, inclusiveness, transparency, and sustainable technological development. These international developments demonstrate the growing recognition that AI governance requires multidimensional regulatory approaches combining legal norms, ethical principles, and institutional oversight mechanisms.⁷

Compared to several developed jurisdictions, Indonesia's AI regulatory framework remains relatively fragmented and sectoral. Existing regulations primarily focus on electronic transactions, information technology governance, and digital infrastructure without specifically addressing AI-related risks and responsibilities.⁸ Moreover, institutional coordination among government agencies remains limited, resulting in overlapping policies and inconsistent regulatory approaches. This condition creates challenges for businesses, policymakers, and society in understanding the legal boundaries and ethical obligations associated with AI utilization. Therefore, the harmonization of AI-related policies and regulations becomes increasingly necessary within Indonesia's evolving digital governance landscape.

Policy harmonization is essential not only to create legal certainty but also to support sustainable technological innovation. A fragmented regulatory framework may hinder investment, weaken public trust, and create inconsistencies in law enforcement. Harmonized AI governance should involve collaboration among legislators, regulatory institutions, technology developers, academic communities, and civil society organizations.⁹ Through integrated governance mechanisms, Indonesia can develop a regulatory model capable of balancing innovation and economic growth with public protection, ethical responsibility, and

⁵ Syaiful Khoiri Harahap, Ismayani Ismayani, and Maulidiansyah Tuah Sibarani, "Legal Transformation in the Digital Age: Analysis of Legal Changes to Artificial Intelligence Regulations in Indonesia," *Focus Hukum UPMI* 1, no. 1 (2022): 1–14.

⁶ Mochamad Kevin Romadhona and Rachmat Dimas Oktafenanda, "ETHICS AND GOVERNANCE OF AI IN HEALTHCARE: CASE INDONESIA, EU, AND THE US," *Jurnal Ilmiah Administrasi Pemerintahan Daerah* 17, no. 2 SE-Articles (2025): 201–23, <https://doi.org/10.33701/jiapd.v17i2.5683>.

⁷ Herijanto Becti et al., "Lessons Learned from Global Practices and Public Leadership toward Mature AI Regulation for E-Government in Indonesia," *Cogent Social Sciences* 12, no. 1 (December 31, 2026), <https://doi.org/10.1080/23311886.2026.2652002>.

⁸ Bayu Rochmawan, "ARTIFICIAL INTELLIGENCE AND LEGAL PROCESS IN INDONESIA, NAVIGATING LEGAL ETHICS IN THE ALGORITHM ERA," *Interdisciplinary Journal of Global and Multidisciplinary* 1, no. 1 SE-Articles (2025): 31–38, <https://jurnal-ijgam.or.id/index.php/IJGAM/article/view/6>.

⁹ Mufti Nurlatifah, "Searching the Horizon of AI Regulation," in *Proceedings of the International Conference on Communication and New Media Studies (COMNEWS 2025)* (Springer Nature, 2026), 166.

democratic accountability. Such an approach is crucial to ensuring that AI technologies contribute positively to national development.

This study seeks to examine the legal challenges arising from AI implementation in Indonesia and to analyze the urgency of ethical governance and policy harmonization in regulating AI technologies.¹⁰ The research focuses on identifying regulatory gaps, evaluating existing legal instruments, and exploring the relevance of international AI governance principles within the Indonesian legal context. By analyzing the intersection between law, ethics, and technology policy, this study aims to contribute to broader academic discussions regarding responsible AI governance in developing countries.

Ultimately, the regulation of artificial intelligence in Indonesia should not merely emphasize technological control, but also prioritize human dignity, justice, transparency, and social responsibility. AI governance requires adaptive legal frameworks capable of responding to rapid technological change while preserving democratic values and constitutional protections. In this context, legal reform and policy harmonization become strategic necessities for establishing accountable, ethical, and sustainable AI governance in Indonesia's future digital ecosystem.

RESEARCH METHODS

This study employs a normative juridical research method with a qualitative approach to examine the legal challenges, ethical governance, and policy harmonization related to the regulation of artificial intelligence (AI) in Indonesia.¹¹ The normative juridical method is used to analyze legal norms, statutory regulations, and policy frameworks relevant to AI governance, including laws on electronic information and transactions, personal data protection, cybersecurity, consumer protection, and digital governance. This research also adopts a conceptual and comparative approach, examining key legal doctrines and ethical principles surrounding AI regulation while comparing Indonesia's regulatory landscape with international frameworks such as the UNESCO Recommendation on the Ethics of Artificial Intelligence, the OECD AI Principles, and the European Union AI Act. Primary legal materials consist of national legislation, government policy documents, and international regulatory instruments, while secondary materials include academic journal articles, legal commentaries, and scholarly publications related to AI law and governance.

The analytical process is conducted through descriptive-analytical and prescriptive methods. The descriptive-analytical stage identifies and evaluates regulatory gaps, institutional limitations, and legal uncertainties within Indonesia's current AI governance framework. Furthermore, ethical governance issues such as accountability, transparency, algorithmic fairness, and data protection are analyzed through the lens of contemporary legal theory and digital ethics. The prescriptive stage aims to formulate recommendations for policy harmonization by integrating legal certainty, ethical safeguards, and innovation-oriented regulatory strategies. Through this methodological framework, the study seeks to develop a comprehensive understanding of how Indonesia can establish an adaptive, coherent, and human-centered regulatory model for artificial intelligence in response to the rapidly evolving digital ecosystem.

¹⁰ Dodi Jaya Wardana and Deni Setiyawan, "Integration of Artificial Intelligence in Indonesian Legislation: Towards Participatory and Transparent Smart Law-Makin," *Jurnal Hukum IUS QUIA IUSTUM* 32, no. 3 (October 25, 2025): 634–52, <https://doi.org/10.20885/iustum.vol32.iss3.art5>.

¹¹ John W Creswell and J David Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (Sage publications, 2017).

ANALYSIS AND DISCUSSION

Legal Challenges in Regulating Artificial Intelligence in Indonesia

The development of artificial intelligence (AI) has significantly transformed the structure of contemporary digital society.¹² AI is increasingly utilized in various sectors, including governance, finance, healthcare, education, transportation, and electronic commerce. Through technologies such as machine learning, predictive analytics, and automated decision-making systems, AI contributes to efficiency, productivity, and innovation in public and private institutions. In Indonesia, the rapid growth of the digital economy has accelerated the adoption of AI technologies, particularly in business services, financial technology, and digital platforms. However, the accelerated expansion of AI has simultaneously generated legal complexities that challenge the readiness of the national legal system.¹³

One of the primary legal issues concerns the inability of existing laws to comprehensively regulate AI technologies. Most Indonesian digital regulations were formulated before the emergence of advanced AI systems and therefore focus primarily on electronic transactions, information technology infrastructure, and conventional cybersecurity concerns. Existing laws do not adequately address the autonomous and adaptive nature of AI systems, especially those capable of generating independent decisions without direct human intervention. As a result, current legal frameworks often fail to provide clear standards regarding responsibility, supervision, and accountability in AI implementation.¹⁴

The issue of legal accountability constitutes one of the most significant challenges in AI governance. Traditional legal systems generally assume that legal responsibility is attached to human actors or legal entities capable of intentional conduct. However, AI systems can independently process data, learn from algorithms, and produce outcomes that are difficult to predict even by their developers. This condition creates uncertainty regarding who should bear responsibility when AI systems cause harm, discrimination, financial loss, or violations of individual rights.¹⁵ Determining whether liability should be imposed on developers, operators, corporations, or users remains a complex legal debate within contemporary AI regulation.

In addition to accountability, the problem of algorithmic transparency also raises substantial legal concerns. Many AI systems operate through “black box” mechanisms in which decision-making processes are not fully understandable or explainable to users and regulators. This lack of transparency creates difficulties in assessing whether AI-generated decisions are fair, objective, and lawful. In sectors such as banking, recruitment, healthcare, and law enforcement, opaque algorithmic systems may produce discriminatory outcomes without adequate mechanisms for review or correction. Consequently, the absence of legal obligations concerning explainability and transparency weakens public trust in AI technologies.¹⁶

Another important challenge relates to the fragmented nature of Indonesia’s AI-related regulations. Currently, AI governance is indirectly regulated through various sectoral laws and institutional policies, including regulations concerning electronic information, consumer

¹² A Saphira ADC Firza, K Samudera, “Legal Arrangement of Artificial Intelligence In Indonesia: Challenges and Opportunities,” *Jurnal Peradaban Hukum* 1, no. 2 SE-Articles (2023), <https://doi.org/10.33019/jph.v1i2.15>.

¹³ Gunawan Widjaja, “LEGAL TRANSFORMATION IN THE AGE OF ARTIFICIAL INTELLIGENCE: A LITERATURE REVIEW ON REGULATORY, ETHICAL AND DATA PROTECTION CHALLENGES IN INDONESIA,” *INJOSEDU: International Journal of Social and Education* 3, no. 2 (2026): 168–82.

¹⁴ F Hidayat, “Regulating Artificial Intelligence Liability in Indonesia: A Normative Analysis of Accountability in Autonomous Decision-Making Systems,” *Lex Recta: Journal of Law and Normative Justice* 1, no. 1 SE-Articles (March 1, 2026): 1–10, <https://sovereignresearch.org/lex-recta/article/view/46>.

¹⁵ Ardina Khoirun Nisa, “The Prospect of AI Law in Indonesian Legal System: Present and Future Challenges,” *The Indonesian Journal of International Clinical Legal Education* 6, no. 1 (March 31, 2024): 25–48, <https://doi.org/10.15294/iccle.v6i1.4686>.

¹⁶ Upit Elya Rohimi, “Artificial Intelligence and Cybersecurity Regulation in Indonesia: Towards an Adaptive Legal Framework,” *Indonesian Cyber Law Review* 2, no. 1 (May 27, 2025): 42–51, <https://doi.org/10.59261/iclr.v2i1.14>.

protection, financial services, and data governance. However, these regulations are not integrated into a unified national framework specifically addressing AI technologies. As a result, regulatory standards differ across sectors, creating inconsistencies in implementation and supervision. Fragmented governance also increases the possibility of overlapping authority among state institutions responsible for digital regulation.¹⁷

The absence of comprehensive AI legislation further creates uncertainty for innovation and investment. Technology companies and digital startups often face ambiguity regarding legal compliance requirements, particularly concerning data usage, algorithmic accountability, and consumer protection standards. Regulatory uncertainty may discourage technological investment and slow the development of AI innovation ecosystems in Indonesia. At the same time, weak regulation may expose society to risks associated with unethical or irresponsible AI deployment. Therefore, legal certainty becomes essential for balancing technological innovation with public protection.

Data protection represents another crucial legal issue in AI governance. AI systems depend heavily on large-scale data collection and processing mechanisms to improve predictive accuracy and machine learning performance. These processes frequently involve personal and behavioral data collected from users through digital platforms, social media, and online services. Although Indonesia has enacted legislation concerning personal data protection, implementation challenges remain substantial, particularly regarding supervision, enforcement, and institutional coordination. Weak data governance mechanisms increase the risk of unauthorized data access, misuse of personal information, and digital surveillance practices.

The integration of AI technologies into surveillance systems also raises concerns regarding privacy rights and civil liberties. Facial recognition technologies, biometric identification systems, and predictive monitoring applications possess the potential to strengthen state and corporate surveillance capacities. Without adequate legal safeguards, these technologies may be used excessively or arbitrarily, threatening constitutional rights to privacy and freedom of expression. In democratic societies, the expansion of AI-driven surveillance requires strict legal limitations and accountability mechanisms to prevent abuse of power and protect fundamental human rights.

Cybersecurity risks further complicate the regulation of AI systems. AI technologies are vulnerable to cyberattacks, data manipulation, and adversarial interference capable of disrupting automated decision-making processes. Malicious actors may exploit weaknesses within AI systems to manipulate algorithms, spread misinformation, or compromise digital infrastructure. In sectors such as finance, transportation, and healthcare, cyberattacks against AI systems could create serious economic and social consequences. Therefore, AI governance must incorporate strong cybersecurity frameworks capable of ensuring system reliability, resilience, and public safety.

Another legal challenge concerns the ethical implications of algorithmic bias and discrimination. AI systems are constructed using datasets that may reflect existing social inequalities, stereotypes, or historical discrimination. As a result, AI technologies may unintentionally reproduce biased outcomes in areas such as employment, lending, criminal justice, and public services. Discriminatory algorithmic decisions may disproportionately affect vulnerable groups and deepen social inequality. Indonesian legal frameworks currently lack specific mechanisms for auditing, monitoring, and correcting algorithmic discrimination, thereby limiting effective legal remedies for affected individuals.

¹⁷ Zulkham Sadat Zuwanda et al., "Ethical and Legal Analysis of Artificial Intelligence Systems in Law Enforcement with a Study of Potential Human Rights Violations in Indonesia," *The Easta Journal Law and Human Rights* 2, no. 03 (June 28, 2024): 176–85, <https://doi.org/10.58812/eslhr.v2i03.283>.

The rapid evolution of AI technologies also creates challenges for legislative adaptation. Technological developments frequently progress faster than legal reform processes, causing regulatory frameworks to lag behind emerging innovations. In many cases, policymakers and legal institutions face difficulties in understanding the technical complexity of AI systems and their societal implications. This gap between technological advancement and regulatory capacity may weaken the effectiveness of law enforcement and institutional oversight. Consequently, adaptive and technology-responsive legal approaches are necessary to ensure that regulations remain relevant within rapidly changing digital environments.

Ultimately, the legal challenges surrounding AI regulation in Indonesia demonstrate the urgent need for comprehensive regulatory reform. Effective AI governance requires integrated legal frameworks capable of addressing accountability, transparency, data protection, cybersecurity, and human rights concerns simultaneously. Such regulation should not merely focus on controlling technological risks but also encourage innovation and sustainable digital development. By establishing clear legal standards and harmonized institutional mechanisms, Indonesia can develop a responsible AI governance model that protects public interests while supporting the growth of the national digital economy.

Ethical Governance and Human-Centered Artificial Intelligence

The rapid expansion of artificial intelligence (AI) technologies has not only generated legal challenges but has also intensified ethical debates concerning the relationship between technology and humanity.¹⁸ AI systems increasingly influence decision-making processes in social, economic, and political life, ranging from financial transactions and healthcare diagnostics to public administration and law enforcement. While these technologies provide efficiency and innovation, they simultaneously raise concerns regarding fairness, accountability, transparency, and respect for human dignity. Consequently, ethical governance has become an essential component of contemporary AI regulation to ensure that technological advancement remains aligned with societal values and democratic principles.

One of the central ethical concerns in AI governance relates to the issue of algorithmic bias. AI systems are developed using datasets and machine learning processes that may contain historical inequalities, social stereotypes, and discriminatory patterns. As a result, AI-generated decisions may unintentionally reproduce or even strengthen existing forms of discrimination. In recruitment systems, for example, algorithms may favor certain demographic groups due to biased training data. Similarly, AI-based credit scoring systems may disadvantage economically marginalized communities.¹⁹ Such outcomes demonstrate that technological systems are not entirely neutral but are deeply influenced by the social and institutional contexts in which they are created.

The issue of fairness therefore becomes fundamental within ethical AI governance. Fairness requires that AI systems operate without unjust discrimination and provide equal treatment to individuals regardless of gender, ethnicity, religion, social status, or other personal characteristics. In Indonesia's pluralistic society, ensuring fairness in AI implementation is particularly important to prevent the deepening of social inequality and digital exclusion.²⁰ Ethical governance frameworks must therefore incorporate anti-discrimination principles and

¹⁸ Ozlem Ozmen Garibay et al., "Six Human-Centered Artificial Intelligence Grand Challenges," *International Journal of Human-Computer Interaction* 39, no. 3 (February 7, 2023): 391-437, <https://doi.org/10.1080/10447318.2022.2153320>.

¹⁹ Eunji Emily Kim, "Ethical AI Standards and Governance: A Perspective of Human-Centered AI," in *Handbook of Human-Centered Artificial Intelligence* (Singapore: Springer Nature Singapore, 2026), 1-34, https://doi.org/10.1007/978-981-97-8440-0_61-2.

²⁰ Anton Sigfrids et al., "Human-Centricity in AI Governance: A Systemic Approach," *Frontiers in Artificial Intelligence* 6 (February 14, 2023), <https://doi.org/10.3389/frai.2023.976887>.

algorithmic auditing mechanisms capable of identifying and correcting biased outcomes within AI systems.

Transparency also represents a critical principle in ethical AI governance. Many AI technologies function through highly complex algorithms that are difficult for users, regulators, and even developers to fully understand. This condition is commonly described as the “black box” problem, where automated decisions are produced without clear explanations regarding the underlying reasoning processes. Lack of transparency creates challenges for accountability and weakens public trust in AI systems. Individuals affected by AI-generated decisions may experience difficulties in challenging or questioning outcomes that significantly influence their lives. Therefore, explainability and transparency are necessary to ensure procedural fairness and democratic oversight.²¹

Another important ethical dimension concerns accountability in automated decision-making. AI systems are increasingly capable of making autonomous or semi-autonomous decisions without direct human intervention. However, when these decisions produce harmful consequences, questions emerge regarding who should bear ethical and legal responsibility. Ethical governance requires clear accountability structures to ensure that human actors remain responsible for the design, deployment, and supervision of AI systems.²² Human oversight is essential to prevent excessive dependence on automation and to maintain moral responsibility within technological governance.

Human-centered AI governance emphasizes that technological innovation must prioritize human dignity, welfare, and autonomy. AI should function as a tool that supports human development rather than replacing human judgment entirely. In this context, ethical governance rejects the notion that technological efficiency alone should determine public policy and institutional decision-making. Instead, AI systems should remain subject to meaningful human control and democratic accountability. Human-centered approaches also require the protection of fundamental rights, including privacy, freedom of expression, equality, and access to justice.²³

Privacy protection constitutes another major ethical challenge within AI ecosystems. AI systems depend heavily on extensive data collection and processing mechanisms to improve algorithmic performance and predictive accuracy. Personal information gathered through digital platforms, biometric systems, and online interactions may be used to construct behavioral profiles capable of influencing consumer choices, political preferences, and social interactions. Without strong ethical safeguards, such practices may undermine individual autonomy and create intrusive surveillance environments. Ethical governance therefore requires limitations on data exploitation and stronger protections for informational privacy.²⁴

The increasing use of AI-driven surveillance technologies further intensifies ethical concerns regarding civil liberties and democratic governance. Facial recognition systems, predictive policing technologies, and digital monitoring tools may enhance institutional

²¹ Aparicio Bernardo da Costa da Conceição and Suhermin Suhermin, “BRIDGING ETHICS AND INNOVATION IN ARTIFICIAL INTELLIGENCE: A HUMAN-CENTERED APPROACH TO RESPONSIBLE TECHNOLOGY DESIGN,” *International Conference of Business and Social Sciences*, December 15, 2025, 206–14, <https://doi.org/10.24034/icobuss.v5i1.662>.

²² Yang Yue and Joseph Z Shyu, “An Overview of Research on Human-Centered Design in the Development of Artificial General Intelligence,” *ArXiv Preprint ArXiv:2309.12352*, 2023, <https://doi.org/https://doi.org/10.48550/arXiv.2309.12352>.

²³ Benedetta Giovanola and Paolo Granata, “Ethics for Human-Centered Education in the Age of AI,” in *Entrepreneurship and Digital Humanities* (Edward Elgar Publishing, 2024), 96–109, <https://doi.org/10.4337/9781035331864.00016>.

²⁴ Usman Ahmad Usmani, Ari Happonen, and Junzo Watada, “Human-Centered Artificial Intelligence: Designing for User Empowerment and Ethical Considerations,” in *2023 5th International Congress on Human-Computer Interaction, Optimization and Robotic Applications (HORA)* (IEEE, 2023).

efficiency but also risk enabling excessive state or corporate surveillance. In democratic societies, unrestricted surveillance threatens freedom of expression, privacy rights, and social trust. Ethical governance frameworks must therefore establish proportionality principles and oversight mechanisms capable of preventing abuse of surveillance technologies while ensuring public accountability.

Ethical governance also requires inclusiveness and social participation in policymaking processes. AI regulation should not be dominated exclusively by governments or technology corporations, as such concentration of power may marginalize public interests and vulnerable communities. Instead, ethical AI governance must involve interdisciplinary collaboration among policymakers, legal scholars, technologists, academic institutions, and civil society organizations. Participatory governance mechanisms allow diverse perspectives to contribute to the development of fair and socially responsive AI policies. Public engagement also strengthens democratic legitimacy in technological governance.

In Indonesia, ethical governance mechanisms for AI remain relatively underdeveloped. Existing digital policies largely prioritize economic growth, innovation, and technological efficiency without comprehensively integrating ethical principles into regulatory implementation. Institutional frameworks capable of supervising ethical compliance in AI systems are still limited, and public awareness regarding AI-related risks remains relatively low. This situation creates challenges for ensuring responsible AI deployment, particularly in sectors directly affecting public welfare such as healthcare, education, and law enforcement. Therefore, ethical governance must become an integral component of Indonesia's future digital policy agenda.

Public literacy regarding AI technologies also plays an important role in ethical governance. Citizens who lack understanding of how AI systems operate may become vulnerable to manipulation, misinformation, and digital exploitation. Strengthening public awareness about algorithmic decision-making, data protection, and digital rights is therefore necessary to enhance democratic participation and accountability. Educational institutions, media organizations, and civil society groups can contribute significantly to developing critical digital literacy capable of supporting responsible AI adoption within society.

Ultimately, ethical governance and human-centered AI are essential for ensuring that technological innovation contributes positively to social welfare and democratic development. Effective AI governance must balance innovation with ethical responsibility, ensuring that technological systems remain transparent, accountable, inclusive, and respectful of human rights. For Indonesia, the development of human-centered AI governance requires integrated collaboration among legal institutions, policymakers, technological actors, and society as a whole. Through ethical and participatory governance frameworks, AI technologies can become instruments of inclusive development that strengthen justice, public trust, and sustainable digital transformation.

Policy Harmonization and the Future of AI Regulation in Indonesia

The rapid development of artificial intelligence (AI) technologies has created significant challenges for legal and policy systems across the world, including Indonesia.²⁵ AI technologies evolve dynamically and continuously reshape economic, social, and governmental structures. In Indonesia, the acceleration of digital transformation has encouraged broader AI adoption in areas such as public administration, financial services, healthcare, education, and electronic

²⁵ Prabu Revolusi and Radians Krisna Febriandy, "Developing AI Regulations in Indonesia: Policy Recommendations Based on Comparative Policy Analysis from the European Union, the United States, and Singapore," *Jurnal Indonesia: Manajemen Informatika Dan Komunikasi* 6, no. 2 (May 10, 2025): 1035-49, <https://doi.org/10.63447/jimik.v6i2.1380>.

commerce. However, the increasing complexity of AI systems has simultaneously exposed weaknesses within the national regulatory structure, particularly regarding policy coordination and institutional governance. Consequently, policy harmonization has become an urgent necessity to ensure that AI development remains consistent with legal certainty, ethical principles, and democratic governance.

One of the primary problems within Indonesia's AI governance framework is regulatory fragmentation. Existing regulations related to AI are dispersed across various legal sectors, including electronic information law, personal data protection, cybersecurity regulation, financial services regulation, and consumer protection law. These regulations were not specifically designed to govern AI technologies comprehensively, resulting in overlapping authority among institutions and inconsistent regulatory approaches.²⁶ Different government agencies often adopt separate standards and supervisory mechanisms regarding AI implementation, creating legal uncertainty and institutional inefficiency.

Regulatory fragmentation also weakens the effectiveness of policy enforcement. In practice, the absence of integrated standards concerning AI accountability, transparency, and ethical compliance creates confusion among technology developers, businesses, and regulatory institutions. Companies operating AI systems may encounter differing compliance requirements depending on the sector in which they operate.²⁷ Such inconsistencies not only complicate legal implementation but may also hinder technological innovation and investment. Therefore, harmonized governance is necessary to establish clear and consistent standards applicable across sectors and institutions.

Another important issue concerns institutional coordination within AI governance. Effective regulation of AI technologies requires collaboration among multiple state institutions responsible for digital governance, cybersecurity, economic policy, communications, and human rights protection. However, fragmented institutional authority often leads to overlapping policies and weak coordination mechanisms. Without integrated governance structures, regulatory institutions may struggle to effectively supervise rapidly evolving AI technologies. Consequently, strengthening inter-institutional coordination becomes essential for building coherent and responsive AI governance frameworks.²⁸

The urgency of policy harmonization is also influenced by the transnational nature of AI technologies.²⁹ AI systems frequently operate through cross-border digital infrastructures involving global data flows, multinational technology corporations, and international digital platforms. As a result, national regulatory frameworks cannot function effectively in isolation from international governance developments. Indonesia must therefore align its domestic policies with global standards and international best practices to ensure regulatory compatibility and strengthen international cooperation in digital governance.

International developments in AI regulation provide valuable references for Indonesia

²⁶ Cecep Mustafa and Rita Komalasari, "Enhancing Indonesia-EU Relations: Balancing AI Regulation, National Security, and Economic Growth In a Digital Age [Meningkatkan Hubungan Indonesia-Eropa: Menyeimbangkan Regulasi AI, Keamanan Nasional, Dan Pertumbuhan Ekonomi Di Era Digital]," *Jurnal Politika Dinamika Masalah Politik Dalam Negeri Dan Hubungan Internasional* 16, no. 1 (July 21, 2025): 57-74, <https://doi.org/10.22212/jp.v16i1.4725>.

²⁷ Irsan Rahman et al., "Harmonization of Digital Laws and Adaptation Strategies in Indonesia Focusing on E-Commerce and Digital Transactions," *Innovative: Journal Of Social Science Research* 4, no. 1 SE-Articles (January 18, 2024): 4314-27, <https://doi.org/10.31004/innovative.v4i1.8240>.

²⁸ Adhe Ismail Ananda, "ARTIFICIAL INTELLIGENCE AS A CO-LEGISLATOR: THE IDEA OF HARMONIZING LAWS AND REGULATIONS TOWARDS SMART LAWMAKING," *Domus Legalis Cogitatio* 3, no. 1 (April 18, 2026): 1-18, <https://doi.org/10.24002/dlc.v3i1.12662>.

²⁹ Nila Kurnia Wati and Imam Hanafi, "Artificial Intelligence (AI) in Public Policy Reform: Approaches, Challenges, And Outcomes," *Jurnal Ilmu Administrasi: Media Pengembangan Ilmu Dan Praktek Administrasi* 22, no. 2 (December 31, 2025): 172-85, <https://doi.org/10.31113/jia.v22i2.1283>.

in constructing future governance models. The European Union AI Act, for example, introduces a comprehensive risk-based approach that categorizes AI systems according to their potential impact on society, public safety, and fundamental rights. High-risk AI applications are subject to stricter obligations concerning transparency, accountability, and human oversight. This model demonstrates the importance of proportional regulation capable of balancing technological innovation with public protection and ethical responsibility.

Similarly, international organizations such as UNESCO and the OECD have developed ethical principles emphasizing transparency, accountability, fairness, privacy protection, and human-centered AI development. These frameworks recognize that AI governance should not solely focus on economic and technological efficiency but must also protect human rights, democratic values, and social justice. Such principles are increasingly becoming global standards within contemporary digital governance discussions.

For Indonesia, adopting international principles does not mean replicating foreign regulatory models entirely. Instead, policy harmonization should involve contextual adaptation based on Indonesia's constitutional values, socio-cultural conditions, and developmental priorities. Indonesia possesses unique characteristics as a pluralistic democratic society with diverse social structures and varying levels of digital literacy. Therefore, AI governance frameworks must integrate universal ethical standards with local legal traditions, public interests, and national development objectives. Adaptive regulation is necessary to ensure that AI governance remains relevant within Indonesia's social and institutional context.

Comprehensive AI regulation in Indonesia should include clear legal standards regarding algorithmic accountability, transparency, data governance, cybersecurity, and ethical compliance. Legal certainty concerning the responsibilities of developers, operators, and users of AI systems is crucial for strengthening public trust and ensuring effective law enforcement. In addition, regulatory mechanisms should establish procedures for auditing AI systems, evaluating algorithmic risks, and preventing discriminatory outcomes. Such measures are important to guarantee that AI technologies operate in accordance with principles of justice and public accountability.

Cybersecurity and personal data protection must also become central components of harmonized AI governance. AI systems rely heavily on large-scale data processing mechanisms that create vulnerabilities to cyberattacks, data breaches, and unauthorized surveillance. Without strong cybersecurity frameworks, AI technologies may threaten national security, economic stability, and individual privacy rights. Therefore, policy harmonization should integrate AI regulation with broader digital security strategies and data protection mechanisms to ensure safe and trustworthy technological ecosystems.

Another important dimension of policy harmonization concerns public participation and multi-stakeholder collaboration. AI governance cannot rely solely on state-centered regulation because technological innovation involves diverse actors, including private corporations, academic institutions, civil society organizations, and digital communities. Participatory governance mechanisms enable broader societal involvement in shaping ethical standards and regulatory priorities. Universities and research institutions can contribute through interdisciplinary research and policy recommendations, while civil society organizations can strengthen public oversight and democratic accountability within AI governance processes.

Ultimately, policy harmonization represents a strategic foundation for the future of AI regulation in Indonesia. Harmonized governance frameworks can strengthen legal certainty, encourage responsible innovation, and protect public interests simultaneously. Through integrated regulation combining legal norms, ethical principles, institutional coordination, and public participation, Indonesia can develop a human-centered AI governance model capable of

responding to rapid technological change. Such an approach will not only support sustainable digital transformation but also ensure that AI technologies contribute positively to democratic governance, economic development, social justice, and national welfare in the future digital era.

CONCLUSION

The development of artificial intelligence (AI) in Indonesia presents both significant opportunities and complex regulatory challenges within the country's evolving digital ecosystem. This study demonstrates that Indonesia's existing legal framework remains fragmented and insufficient to comprehensively regulate AI technologies, particularly regarding accountability, transparency, data protection, cybersecurity, and algorithmic governance. The rapid adoption of AI across various sectors has exposed gaps in legal supervision and institutional coordination, creating uncertainty in the implementation and enforcement of digital regulations. Furthermore, ethical concerns related to algorithmic bias, privacy protection, discrimination, and human rights highlight the necessity of integrating ethical governance principles into AI regulation. Consequently, AI governance in Indonesia cannot rely solely on conventional legal mechanisms but requires adaptive, interdisciplinary, and human-centered regulatory approaches capable of responding to rapid technological transformation. This study further emphasizes that policy harmonization is essential for establishing effective and sustainable AI governance in Indonesia. Harmonized regulation should integrate sectoral policies into a comprehensive national framework that balances technological innovation with public protection, democratic accountability, and social justice. International governance models developed by the European Union, UNESCO, and the OECD provide important normative references for developing transparent, accountable, and human-centered AI governance systems. However, Indonesia must adapt these principles according to its constitutional values, socio-cultural diversity, and national development priorities. Through integrated legal reform, institutional collaboration, ethical oversight, and public participation, Indonesia can establish a responsible AI governance model that supports innovation while safeguarding human dignity, social welfare, and democratic values in the future digital era.

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