Embedding Ethical AI in Digital Public Infrastructure: Strategic Governance Pathways for Indonesia

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ABSTRACT

Indonesia's accelerating digital transformation, driven by programs such as Digital ID and INA Digital, has introduced both significant opportunities and complex governance challenges as Artificial Intelligence (AI) becomes integrated into public-sector decision-making. This conceptual paper proposes a strategic governance framework for ethical AI that aligns international standards such as the OECD AI Principles, the EU AI Act, and the NIST AI Risk Management Framework with Indonesia's institutional and regulatory environment. The study contributes to the literature by articulating a policy-oriented model operationalizing ethics, transparency, and accountability within the national digital ecosystem. It further demonstrates how anticipatory governance, multistakeholder collaboration, and adaptive regulation can be embedded through ongoing programs led by the Ministry of Communication and Digital (Komdigi), BSSN, and BRIN. By linking global frameworks with local implementation pathways, this research provides conceptual advancement and policy relevance for emerging economies seeking to institutionalize trustworthy AI governance.

Keywords: AI Governance; Digital Public Infrastructure; Ethical AI; Policy Relevance

ABSTRAK

Transformasi digital yang berkembang pesat di Indonesia melalui berbagai program seperti Digital ID dan INA Digital menghadirkan peluang besar sekaligus tantangan tata kelola yang kompleks ketika Kecerdasan Buatan (*Artificial Intelligence,* AI) mulai digunakan dalam pengambilan keputusan sektor publik. Kajian konseptual ini mengusulkan kerangka tata kelola strategis terhadap AI yang beretika dengan menyesuaikan standar dan kerangka kerja internasional seperti *OECD AI Principles*, *EU AI Act*, dan *NIST AI Risk Management Framework* ke dalam konteks kelembagaan dan regulasi di Indonesia. Penelitian ini memberikan kontribusi konseptual dengan merumuskan model kebijakan yang berorientasi pada implementasi untuk menanamkan nilai etika, transparansi, dan akuntabilitas dalam ekosistem digital nasional. Selain itu, penelitian ini menunjukkan bagaimana tata kelola antisipatif, kolaborasi berbagai pemangku kepentingan, dan regulasi adaptif dapat dijalankan melalui program yang dikelola oleh Kementerian Komunikasi dan Digital (Komdigi)**,** Badan Siber dan Sandi Negara (BSSN)**,** serta Badan Riset dan Inovasi Nasional (BRIN)**.** Dengan menghubungkan kerangka global dengan jalur implementasi nasional, penelitian ini memberikan kemajuan konseptual sekaligus relevansi kebijakan yang nyata bagi negara berkembang yang berupaya melembagakan tata kelola AI yang tepercaya.

Kata Kunci: Etika AI; Infrastruktur Digital; Relevansi Kebijakan; Tata kelola AI

INTRODUCTION

Indonesia is undergoing a rapid transformation in digital governance, marked by the deployment of national digital identity systems, e-government platforms, and integrated smart infrastructure. As part of this acceleration, Artificial Intelligence (AI) is increasingly being integrated into public infrastructure projects to enhance service delivery, optimize resource allocation, and strengthen institutional responsiveness. However, this integration is not without risk. As AI systems begin to influence high-stakes decisions in public health, social welfare distribution, surveillance, and law enforcement, new ethical concerns emerge, ranging from algorithmic bias and opaque decision-making to the erosion of public trust in digital services.

Recent scholarship has emphasized that the ethical deployment of AI in the public sector must balance innovation with institutional accountability (Busuioc, 2021; Roberts, 2024; Taeihagh, 2021). Comparative studies indicate that governance capacity, rather than mere technical readiness, determines long-term trust and citizen adoption (Zaidan et al., 2024).

Despite the growing attention to digital transformation, academic and policy literature in Indonesia has primarily focused on technical implementation, infrastructure financing, or regulatory compliance. There is limited conceptual exploration of how AI ethics can be embedded upstream into digital public infrastructure governance structures. Most studies treat AI ethics as a reactive or external mechanism, through audits or regulatory catchups, rather than a proactive, embedded practice in design, implementation, and institutional learning. The country's readiness to adopt AI in its national digital public infrastructure framework has been assessed through various global benchmarking initiatives, revealing both opportunities and gaps in governance (UNESCO, 2024).

This gap is further amplified by the absence of a unified governance framework that bridges ethical AI principles with the operational realities of public infrastructure in Indonesia. While global frameworks such as the OECD AI Principles, the EU AI Act, and the NIST AI RMF offer foundational guidance, their adaptation to the Indonesian context remains underdeveloped.

Recent systematic reviews underscore that translating global AI ethics frameworks into national contexts requires multi-level governance and value alignment mechanisms (Alhusban & Rahman, 2025; Mišić et al., 2025; Morley & Floridi, 2023). These studies collectively show that effective adaptation depends on public-sector ethics institutionalization, rather than isolated policy statements.

Existing local regulations, including the SPBE Presidential Decree and the Personal Data Protection Law (UU PDP), provide legal scaffolding but fail to address ethical implementation challenges across sectors and institutions.

In response to this gap, this paper offers a conceptual framework that integrates global best practices in ethical AI with Indonesia's unique institutional, cultural, and regulatory dynamics. The paper aims to expand the discourse beyond compliance, towards anticipatory governance, inclusive stakeholder engagement, and the institutionalization of ethics as a core design principle. To this end, this paper introduces a strategic governance pathway tailored for AI-driven public infrastructure.

This study seeks to address the following research question: How can ethical AI principles be systematically embedded within the governance of digital public infrastructure in Indonesia? The paper aims to propose a strategic governance model that aligns AI deployment in the public sector with ethical, transparent, and accountable practices.

METHODOLOGY

This study adopts a conceptual and normative research design aimed at developing a strategic governance framework for embedding ethical AI within Indonesia's digital public infrastructure.

The research proceeds through three main stages:

1. *Literature synthesis,* i.e., a comprehensive review of global AI governance frameworks (OECD AI Principles, EU AI Act, NIST AI RMF) and Southeast Asian policy literature between 2019 and 2025. The methodological approach aligns with prior conceptual reviews on AI governance frameworks that integrate normative analysis with institutional adaptation (Batool et al., 2025; de Almeida, 2025).

2. *Comparative policy analysis,* i.e., examination of Indonesia's institutional and regulatory landscape, including the SPBE Presidential Regulation, the Personal Data Protection Law (UU PDP No. 27/2022), and sectoral initiatives such as Digital ID (IKD) and the National Data Center (PDN).

3. *Analytical integration,* i.e., synthesis of findings into a conceptual governance model tailored to Indonesia's multistakeholder ecosystem.

Secondary data were obtained from peer-reviewed publications, official government documents, and professional insights gathered from practitioner networks, including Cloud Security Alliance (CSA) working groups and discussions, as well as AI CERTs community events focusing on AI security and compliance. These practitioner exchanges contextualized the ethical implementation challenges in cloud and AI-driven infrastructures.

However, this study acknowledges several methodological limitations. As a conceptual and normative inquiry, it does not collect primary data or empirically validate the proposed framework. While including expert perspectives enhances analytical richness, future research should complement this work with case-based evaluations or pilot implementations to test the framework's practical applicability.

LITERATURE REVIEW

Integrating AI into public infrastructure has stimulated a global body of research focused on its transformative potential and the ethical

implications it generates. Scholars agree that AI can enhance public service delivery, predict policy outcomes, and improve resource allocation (Daly et al., 2019). However, using AI in state-driven infrastructure systems also introduces ethical concerns, including algorithmic bias, lack of transparency, and unequal access, particularly in developing economies like Indonesia (Firdaus, 2024; Nilgiriwala et al., 2024).

Global Ethical AI Frameworks and Their Implications

Globally, frameworks such as the OECD AI Principles (OECD, 2019) advocate for human-centered and trustworthy AI, emphasizing values such as transparency, robustness, and accountability. These principles form a widely accepted normative foundation that has influenced various national and institutional guidelines. The European Union's AI Act further expands this discourse by introducing a risk-based taxonomy, classifying AI systems into four levels: unacceptable, high, limited, and minimal risk (Wadipalapa et al., 2024). High-risk systems, such as those used in public services, surveillance, or national infrastructure, are subject to stringent requirements including impact assessments, documentation, and human oversight.

The NIST AI Risk Management Framework (AI RMF), developed in the United States, emphasizes an iterative and adaptive lifecycle approach to AI governance (Choung et al., 2023). Unlike the EU's compliance-heavy model, NIST offers a more flexible structure centered on organizational learning and contextual risk mapping. This model is particularly applicable to nations that exhibit institutional variability. In countries such as Indonesia, regulatory and ethical capacities differ significantly across agencies and regions.

Ethical Gaps in Southeast Asian AI Governance

In the Southeast Asian context, AI governance remains fragmented. According to Nilgiriwala et al. (2024), while nations like Singapore and Malaysia have launched formal AI ethics guidelines, Indonesia remains in the early stages of development. Although legal structures such as the Personal Data Protection Law (UU PDP No. 27/2022) and Presidential Regulation on SPBE are in place, a comprehensive, ethics-first AI governance model is still absent. Firdaus (2024) notes that many Indonesian government initiatives treat ethics as an afterthought, addressing it mainly through audit functions or reactive compliance rather than a proactive design and deployment component.

There is also limited integration between ethical AI frameworks and infrastructure-specific governance literature. While urban planning and innovative city models address issues such as citizen engagement and sustainability, they often omit AI-related concerns or treat them as a mere technical issue rather than normative challenges (Tjondronegoro, 2024). Likewise, policy papers on e-government frequently assume AI deployment to be value-neutral, which ignores the socio-political implications of automation in public systems (Maria & Riswadi, 2024).

Similar gaps have been identified across other developing economies, where ethical frameworks often remain aspirational until supported by enforceable accountability systems (Ahmed & Leung, 2024; Papagiannidis et al., 2025). The alignment between public trust mechanisms and regulatory design is thus critical for sustainable governance.

These gaps highlight the need for a contextualized governance model that incorporates ethical principles and aligns them with Indonesia's unique regulatory, institutional, and cultural landscape. Existing literature has not yet offered a conceptual synthesis that bridges global AI ethics with Indonesia's operational realities in public infrastructure governance. This paper seeks to fill that gap by providing a strategic framework for embedding ethical AI into Indonesia's digital public infrastructure ecosystem, using global best practices as scaffolding but rooted in local policy dynamics.

Building upon the above synthesis, this paper employs a theoretical lens of anticipatory governance**,** integrating responsible innovation theory and ethical design principles to structure the analysis. This theoretical foundation links the global ethical AI discourse with Indonesia's institutional realities, guiding the development of the proposed governance framework.

DISCUSSION

This section discusses the strategic positioning of ethical AI within Indonesia's evolving digital infrastructure landscape. Drawing from global frameworks and the Indonesian policy context, the analysis highlights a critical shift from compliance-oriented digital transformation toward ethically embedded governance models. This shift reflects the global trend where trust, transparency, and accountability have become integral components of responsible innovation, particularly in public sector digital services (Daly et al., 2019; OECD, 2019).

AI deployment in public digital infrastructure, such as e-government systems and citizen databases, has often been framed as a matter of technical efficiency. However,

this conceptual paper reframes the discourse by positioning ethics as a core component of infrastructural governance, not a peripheral concern. While many Southeast Asian governments have released high-level ethical guidelines, Indonesia's approach remains fragmented, lacking a unified framework that can navigate cross-sectoral implementation. By juxtaposing Indonesia's existing digital policies with international standards such as the EU AI Act and the NIST AI RMF, this study argues for a middle-ground model that is both contextually grounded and globally informed.

Scholars increasingly advocate for a governance approach that balances flexibility with institutional coherence by integrating anticipatory and adaptive regulation (de Almeida, 2025; Mišić et al., 2025). Evidence suggests that proactive policy experimentation fosters public-sector innovation without eroding ethical safeguards (Batool et al., 2025; Zaidan et al., 2024).

While the OECD and EU frameworks emphasize formalized regulatory oversight, Indonesia's decentralized administrative structure necessitates adaptive governance. The political economy of digital governance, characterized by fragmented bureaucratic authority and varying local capacities, requires a polycentric model that blends central coordination with regional autonomy.

Culturally, Indonesia's emphasis on *gotong royong* (mutual cooperation) and participatory deliberation can be a normative anchor for AI ethics localization. Embedding public trust mechanisms aligning with these values ensures that ethical AI governance is technically sound and socially legitimate.

A significant insight in this analysis is the necessity of anticipatory governance. This approach is proactive rather than reactive, allowing institutions to anticipate risks and

align AI applications with public values from the outset (Choung et al., 2023). Unlike static regulation, anticipatory governance encourages adaptive learning loops, where ethical considerations evolve alongside technological innovation. Such a model is particularly relevant for Indonesia, where state capacity and regulatory enforcement vary widely across regions.

Empirically, Indonesia's digital public infrastructure ecosystem encompasses initiatives such as the Digital Identity (IKD), the SPBE, and the PDN. They provide rich case material for diagnosing governance gaps. In 2024, the government launched the INA Digital platform, consolidating public service applications and digital identity issuance under one national portal. Concurrently, agencies such as the Komdigi and the Ministry of Home Affairs have accelerated the rollout of IKD to over 60 million citizens as part of the country's push toward a unified digital identity ecosystem.

The World Bank's US$250 million project, approved in 2023 to strengthen Indonesia's civil registration and digital ID infrastructure, reflects the global significance of these reforms. The PDN program, now in its second phase after a 2024 system outage, has sparked national discussions on cloud sovereignty, resilience, and data localization, underscoring the governance tensions between innovation speed and institutional readiness.

Several AI-related policy pilots are also emerging domestically. In early 2025, Komdigi began drafting a National AI Policy Blueprint to complement the Personal Data Protection Law, incorporating ethical AI principles into e-government services. Meanwhile, Indonesia's Financial Services Authority (OJK) and Indonesian Central Bank (Bank Indonesia) have launched regulatory sandboxes to test AI-based credit-scoring and fraud-detection models, revealing both regulatory agility and the need for stronger oversight mechanisms.

A 2025 empirical study on digital-ID acceptance found that trust deficits, uneven broadband infrastructure, and limited digital literacy remain persistent barriers in rural and eastern provinces. Combined with fragmented institutional accountability, these factors highlight the challenge of embedding ethical governance within Indonesia's complex multi-level administrative system.

Regionally, Singapore provides a mature comparative lens. Its Model AI Governance Framework (Version 3.0, 2024) expanded to cover Generative AI, emphasizing risk classification, content provenance, and accountability mechanisms. The framework and the Infocomm Media Development Authority's (IMDA) regulatory sandboxes exemplify anticipatory governance to balance innovation incentives with ethical safeguards.

Malaysia, by contrast, has focused on institutionalizing ethics through formal structures. In 2024, the government issued its National Guidelines on AI Governance and Ethics (AIGE), codifying seven core principles: fairness, safety, privacy, inclusiveness, transparency, accountability, and human-centricity, and establishing the National Blockchain and Artificial Intelligence Committee (NBAIC) under the Ministry of Science, Technology and Innovation. Later that year, the National AI Office (NAIO) under *MyDIGITAL* was created to coordinate nationwide AI initiatives. By 2025, Bank Negara Malaysia (BNM) had opened public consultations on AI use in financial services, reporting that over 70 per cent of financial institutions had deployed at least one AI-driven application by the end of 2024. These initiatives

demonstrate Malaysia's pragmatic, policy-driven approach that offers complementary lessons for Indonesia's evolving AI governance framework.

Another emerging theme is multistakeholder engagement. Ethical governance of AI in public infrastructure cannot rest solely on government agencies. Instead, it requires collaborative ecosystems involving technologists, legal experts, civil society, and citizens. This inclusive governance model supports accountability, builds public trust, and ensures ethical standards are socially legitimate. Drawing from the OECD's emphasis on stakeholder participation, this paper proposes a governance framework that includes consultative mechanisms at both national and sub-national levels.

Furthermore, this study highlights the role of local context. While global frameworks provide valuable blueprints, direct adoption without local calibration may result in ineffective or counterproductive outcomes. For example, algorithmic audits and bias testing methodologies from high-income countries may not reflect the socio-technical realities of Indonesia's public service infrastructure. Therefore, this paper underscores the importance of indigenizing global ethical principles through policy sandboxing, experimental regulation, and public deliberation mechanisms.

In the Indonesian context, civil society actors such as ICT Watch and EngageMedia have actively participated in drafting AI/Internet Governance recommendations and capacity building for community engagement. On the academic front, institutions like Indonesia AI Institute, IAIS, and researcher groups behind projects such as NusaCrowd or the 2025 national language technology survey are contributing context-sensitive insight. Meanwhile, technology communities, e.g.,

the startup Nodeflux or industrial-academic collaborations in local LLM projects (such as *Sahabat-AI* by Indosat & GoTo), bring technical implementation perspectives and feedback loops. These actors collectively strengthen oversight, democratize standards, and provide grounded case knowledge beyond theoretical assumptions.

In summary, the discussion demonstrates that ethical AI governance in Indonesia's public digital infrastructure is not merely a normative ideal but a strategic imperative. By embedding ethics into the design, deployment, and oversight of AI systems, the country can not only mitigate risk but also unlock the transformative potential of AI in delivering inclusive, transparent, and responsive public services.

Proposed Strategic Governance Framework

In relation to the Ethical AI in Indonesia, the proposed framework ideally shall consist of four interlinked phases:

1. *Strategic alignment:* Embedding ethical AI principles into national digital strategies, ensuring alignment with SPBE and PDP Law.

2. *Institutional coordination:* Establishing an inter-agency council involving Komdigi, BSSN, BRIN, OJK, and the Ministry of Administrative Reform to oversee AI governance coherence.

3. *Operational integration:* Developing standardized protocols for algorithmic auditing, bias testing, and public transparency dashboards across government platforms.

4. *Ethical assurance and learning:* Institutionalizing continuous monitoring, public participation, and cross-sector

capacity building through civic–academic–industry partnerships.

The framework is iterative, allowing policy feedback loops and adaptive regulation. A schematic illustration (Figure 1) can visualize these components and their interdependencies.
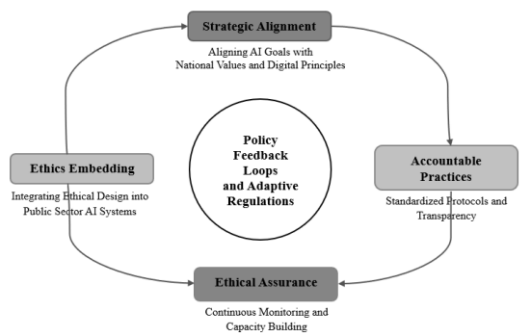

Figure 1. Iterative Framework for Ethical AI Governance in Digital Public Infrastructure

Source: Author's Own Elaboration (2025)

RECOMMENDATIONS

Building upon the proposed strategic governance framework, this section seeks to translate the conceptual foundations into actionable and relevant recommendations that reflect Indonesia's digital-policy landscape in late 2025.

Institutional Implementation

The coordination of ethical AI governance should be anchored in an inter-ministerial structure led by Komdigi, supported by BSSN for cybersecurity assurance, BRIN for AI research and validation, OJK and BI for financial-sector supervision, and the Ministry of Administrative and Bureaucratic Reform (KemenPANRB) for embedding AI governance into *Sistem Pemerintahan Berbasis Elektronik (SPBE)*. At the strategic level, Bappenas plays a pivotal role in aligning AI-ethics policy with the *Digital Indonesia Roadmap 2025–2030* and the Sustainable Development Goals.

Pilot Projects and Regulatory Sandboxes

As of 2025, several pilot initiatives have emerged under Komdigi's INA Digital and IKD programs. The initiatives offer practical entry points for testing algorithmic fairness, transparency, and accountability mechanisms. The government could further establish a National AI Sandbox, jointly facilitated by Komdigi and BRIN, to simulate ethical AI use cases in domains such as e-procurement, social-aid targeting, and citizen-service analytics. While not yet formally launched, this sandbox aligns with the forthcoming National AI Roadmap (2025–2027) currently under policy consultation.

Public and Multistakeholder Participation

Stakeholder engagement should be institutionalized through regular AI Governance Consultative Forums convened by Komdigi and BSSN, integrating perspectives from civil-society organizations (e.g., ICT Watch, EngageMedia), academic networks (e.g., Indonesia AI Institute, IAIS), and industry leaders (e.g., Nodeflux, Telkom, Indosat, GoTo's Sahabat-AI project). These forums can co-design ethical standards, share datasets for algorithmic-bias testing, and document local lessons for ASEAN digital-governance harmonization.

Capacity Building and Human-Resource Development

Sustaining ethical AI governance requires skilled digital professionals. The Digital Talent Scholarship (DTS) initiative under Komdigi now targets 100,000 participants, integrating new tracks on cloud computing, data privacy, and AI ethics. Collaborations with Google Cloud Career Launchpad and Telkom's Digital Academy extend these modules nationwide. Parallel efforts by BSSN through its Cyber Academy emphasize resilience, secure-by-design practices, and

ethical data handling. Partnerships with global professional bodies, such as ISACA, ISC2, and the Cloud Security Alliance, can institutionalize advanced certification pathways and continuous upskilling for public officials and technology practitioners.

Future-Oriented Steps

While several initiatives are operational, the others, such as the National AI Sandbox, integrated ethics audit protocols, and cross-sector certification frameworks, remain prospective and could be prioritized in the National AI Roadmap 2025–2027. These steps would help Indonesia transition from policy formulation to systematic implementation of trustworthy AI governance.

International best practices indicate that embedding ethics into institutional capacity building enhances governance legitimacy and implementation continuity (Busuioc, 2021; Roberts, 2024; Taeihagh, 2021). Establishing cross-sector knowledge networks can translate these principles into measurable performance indicators (Papagiannidis et al., 2025).

Collectively, these actions bridge normative aspirations with practical execution, ensuring that Indonesia's AI governance ecosystem evolves as both ethically grounded and operationally executable within its national digital-transformation agenda.

CONCLUSION

This conceptual paper has examined the intersection between ethical Artificial Intelligence and public digital infrastructure in Indonesia, arguing for a strategic governance framework rooted in ethical principles. By bridging global frameworks such as the OECD Principles, EU AI Act, and NIST AI RMF with the local policy context, the study proposes an anticipatory and multistakeholder model of governance tailored to national needs.

This conclusion resonates with global scholarship emphasizing that ethical AI governance is an iterative learning process rooted in adaptive public institutions (Mišić et al., 2025; Morley & Floridi, 2023). Sustaining this momentum requires embedding evaluation metrics within governance lifecycles, aligning with cross-national studies on responsible innovation and AI accountability (Batool et al., 2025; de Almeida, 2025).

While the framework offers a forward-looking strategy to embed ethics into the lifecycle of AI systems in public services, its implementation may face challenges such as institutional fragmentation, lack of technical expertise, and limited civic participation. These limitations highlight the need for further empirical validation and regulatory experimentation through pilots and sandboxes.

Nonetheless, the insights articulated in this paper provide a conceptual foundation for policymakers and practitioners to reframe AI as an efficient tool and an ethical infrastructure that supports inclusive and trusted digital transformation. Future research may explore cross-sector case studies to refine the proposed framework and assess its real-world applicability.

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REFERENCES

Ahmed, R., & Leung, J. (2024). Balancing innovation and ethics in AI governance for health technology assessment. *Health Technology Assessment, 27*(1), 754–757. https://doi.org/10.1080/13696998.2024.2352821

Alhusban, M., & Rahman, A. (2025). AI ethics: Integrating transparency, fairness, and privacy into governance frameworks. *Ethics and Information Technology, 39*(1), 2463722. https://doi.org/10.1080/08839514.2025.2463722

Batool, S., Zowghi, D., & Bano, M. (2025). AI governance: A systematic literature review. *AI and Ethics, 5,* 3265–3279. https://doi.org/10.1007/s43681-024-00653-w

Busuioc, M. (2021). Accountable artificial intelligence: Holding algorithms to account. *Public Administration Review, 81*(5), 825–836. https://doi.org/10.1111/puar.13293

Choung, H., David, P., & Seberger, J. S. (2023). A multilevel framework for AI governance. *The Global and Digital Governance Handbook*. Taylor & Francis Group. https://doi.org/10.48550/arXiv.2307.03198

de Almeida, M. (2025). Advancing AI governance with a unified theoretical framework: A systematic review. *Perspectives on Public Management and Governance*. https://doi.org/10.1093/ppmgov/gvaf013

Firdaus, M. (2024). Artificial intelligence ethics guidelines in Indonesia: Contestability safeguards and adaptive governance. *Easta Journal of Law and Human Rights, 2*(3), 176–185. https://doi.org/10.58812/eslhr.v2i03.283

Maria, I., & Riswadi, R. (2024). AI governance strategy in the Indonesian regulation system: Offensive or defensive? *Solj Sharia Oikonomia Law Journal, 2*(4), 233–243. https://doi.org/10.70177/solj.v2i4.1643

Mišić, J., van Est, R., & Kool, L. (2025). Good governance of public sector AI: A combined value framework for good order and a good society. *AI and Ethics, 5,* 4875–4889. https://doi.org/10.1007/s43681-025-00751-3

Morley, J., & Floridi, L. (2023). Operationalising AI ethics: Barriers, enablers and next steps. *AI and Society, 38,* 411–423. https://doi.org/10.1007/s00146-021-01308-8

Nugroho, F. (2025). Artificial intelligence regulation and political ethics: An analysis of Indonesia's position in AI governance. *Journal of Political Innovation and Analysis, 2*(1), 42–51. https://doi.org/10.59261/jpia.v2i1.10

OECD. (2019). *OECD Principles on Artificial Intelligence*. Organisation for Economic Co-operation and Development. https://oecd.ai/en/principles

Papagiannidis, S., Li, F., & Bourlakis, M. (2025). Responsible artificial intelligence governance: A review
and research framework. *Journal of Strategic Information Systems, 34*(2), 101885. https://doi.org/
10.1016/j.jsis.2024.101885

Roberts, H. (2024). Global AI governance: Barriers and pathways forward. *International Affairs, 100*(3),
1275–1294. https://doi.org/10.1093/ia/iiae073

Taeihagh, A. (2021). Governance of artificial intelligence: Balancing risk and innovation in public sector
applications. *Policy and Society, 40*(2), 149–167. https://doi.org/10.1080/14494035.2021.1928377

Tjondronegoro, D. W. (2024). Strategic AI governance: Insights from leading nations. *arXiv Preprint, 1,*
1–22. https://doi.org/10.48550/arXiv.2410.01819

UNESCO. (2024). *Ethical Governance of AI: Global Frameworks and Lessons for Southeast Asia.*
UNESCO Publishing. https://unesdoc.unesco.org/ark:/48223/pf0000387120

Wadipalapa, R. P., et al. (2024). An ambitious artificial intelligence policy in a decentralised governance
system: Evidence from Indonesia. *Journal of Current Southeast Asian Affairs, 43*(1), 65–93.
https://doi.org/10.1177/18681034231226393

Zaidan, E., Almarzooqi, M., & Bhatia, G. (2024). AI governance in a complex and rapidly changing world.
Humanities and Social Sciences Communications, 11, 1121. https://doi.org/10.1057/s41599-024-
03560-x