

Artificial Intelligence and Legal Accountability: Challenges for Modern Legal System

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Abstract: *The rapid diffusion of artificial intelligence (AI) into judicial administration, notarial practice, law enforcement, and financial services has exposed a structural gap between the autonomous, opaque, and self-learning character of algorithmic systems and the anthropocentric assumptions embedded in classical doctrines of legal responsibility. This article examines the extent to which fault-based liability, strict liability, and vicarious liability doctrines remain adequate to address harm generated by AI systems, and evaluates comparative regulatory responses in the European Union, the United States, Singapore, and Indonesia. Employing normative legal research through statutory, comparative, and conceptual approaches, this study finds that existing Indonesian instruments principally the Electronic Information and Transactions Law and the Personal Data Protection Law regulate AI only tangentially and leave algorithmic accountability, auditability, and causation largely unaddressed. By contrast, the European Union's risk-based Artificial Intelligence Act imposes graduated obligations of transparency and human oversight according to risk classification. The article argues for a hybrid accountability model combining risk-tiered liability rules, mandatory algorithmic auditing, statutory human-in-the-loop requirements for high-risk systems, and a dedicated compensation mechanism, as a normative foundation for future Indonesian AI legislation.*

Keywords: *Artificial Intelligence; Legal Accountability; Algorithmic Liability; Comparative Law; Legal System Reform.*

INTRODUCTION

The development of artificial intelligence technology over the past decade has transformed from a mere futuristic discourse into a tangible infrastructure supporting various sectors of life, including the legal sector itself. Generative AI systems, predictive algorithms, and machine learning are now being used to assist in contract drafting, conduct credit risk analysis, support defendant recidivism risk assessments, accelerate legal research, and even contribute to decision-making recommendations in several jurisdictions.¹

¹Amy B. Cyphert, "A Human Being Wrote This Law Review Article: GPT-3 and the Practice of Law," UC Davis Law Review 55, no. 1 (2021): 401.



This phenomenon marks a paradigm shift from law as a product solely of human rationality to law that is in direct contact with artificial rationality that works through probabilistic processes and self-learning that are difficult to trace linearly by conventional legal reasoning.²

This acceleration phenomenon is not without risks. When an AI system makes a mistake—whether it be algorithmic discrimination in a recruitment process, a misdiagnosis in a medico-legal decision support system, an autonomous vehicle accident, or disinformation generated by a generative language model that defames someone the fundamental question that arises is: who is legally responsible? Classical legal liability doctrine, whether in the criminal, civil, or administrative realms, is built on the assumption that a legal subject is an entity with will, intent, and the capacity to understand the consequences of its actions.³ Artificial intelligence, however sophisticated, does not meet these ontological prerequisites, so that the imposition of legal responsibility often gets stuck in what is referred to in the literature as a “liability gap” or “accountability gap” an empty space where real harm occurs, but there is no legal subject that can be held adequately accountable doctrinally.

This problem is exacerbated by the technical characteristics of AI itself, particularly its algorithmic opacity, commonly referred to as the “black box” phenomenon. Deep learning models process millions of parameters that interact nonlinearly, so even their developers often cannot explain precisely how a particular output is generated.⁴ This situation creates serious evidentiary difficulties in litigation, as the element of causality a prerequisite for both criminal and civil liability becomes obscured when the causal chain is hidden behind opaque layers of computation. Furthermore, the self-learning nature and adaptability of AI to new data also complicate the application of the doctrine of foreseeability, the backbone of the concept of negligence in civil law.

In the Indonesian context, this issue becomes even more pressing given that existing regulations do not yet provide a comprehensive legal framework to address these challenges. Law No. 11 of 2008 concerning Electronic Information and Transactions, as amended, and Law No. 27 of 2022 concerning Personal Data Protection, were primarily designed to regulate electronic transactions and personal data protection generally, not specifically to address accountability for autonomous decisions made by algorithmic systems.⁵ The Ministry of Communication and Informatics has indeed issued Circular Letter Number 9 of 2023 concerning the Ethics of Artificial Intelligence as an ethical guideline for the use of AI. However, this instrument is non-binding (soft law) and does not contain a legal accountability mechanism that can be enforced in court.⁶ This kind of legal vacuum (*rechtsvacuum*) has the potential to harm the public as users and victims of AI system errors, while also creating legal uncertainty for business actors who develop and operate this technology.

² Hakimi, M., Zarinkhail, S., & Sahnosh, F. A. (2025). Artificial intelligence and legal reform in developing countries: Advancing ethical, rights-based, and accountable digital governance. *Jurnal Ilmiah Telsinas Elektro, Sipil dan Teknik Informasi*, 8(2), 127-144. <https://doi.org/10.38043/telsinas.v8i2.6934>

³ M. Kmail, “The Suitability of Criminal Liability Rules for Artificial Intelligence,” *Journal of Legal, Ethical and Regulatory Issues* 28, Spec. Iss. 2 (2024): 2.

⁴ Piotr Staszkiwicz et al., “Artificial Intelligence Legal Personality and Accountability: Auditors’ Accounts of Capabilities and Challenges for Instrument Boundary,” *Meditari Accountancy Research* 32, no. 7 (2024): 123.

⁵ A. Hadi dan B. Guntara, “Pembaharuan Hukum Nasional dalam Upaya Perlindungan Data Pribadi di Era Disrupsi Kecerdasan Buatan (Artificial Intelligence),” *Jurnal Hukum Mimbar Justitia* 8, no. 1 (2022): 240.

⁶ Surat Edaran Menteri Komunikasi dan Informatika Republik Indonesia Nomor 9 Tahun 2023 tentang Etika Kecerdasan Artifisial.

Meanwhile, several other jurisdictions have begun to respond more progressively to this challenge. The European Union, through Regulation (EU) 2024/1689, also known as the Artificial Intelligence Act, has established the world's first horizontal legal framework that comprehensively regulates the development, marketization, and use of AI systems based on a risk-based approach.⁷ The United States, while lacking comprehensive federal legislation, has developed sectoral and tiered approaches at the state level, along with court decisions that are beginning to shape jurisprudence on product liability and negligence related to AI.⁸ Singapore has taken a middle path through its voluntary yet influential AI Governance Framework Model, which has shaped AI governance practices in Southeast Asia.⁹ This cross-jurisdictional comparison is crucial for providing a normative perspective for Indonesia in formulating a legal framework that aligns with the characteristics of its national legal system, without neglecting proven best practices across various countries. Mapping global regulatory trends also reveals a recurring narrative across recent academic studies: the urgent need for adaptive, transparent, and human rights-based AI governance, in response to systemic barriers such as rigid legal frameworks and minimal stakeholder involvement in the policy-making process.¹⁰ This global narrative provides strong academic legitimacy for the urgency of this research in the Indonesian national context.

The urgency of this study is also inseparable from Indonesia's position as one of the countries with the largest internet and digital application user populations in the world, which naturally makes it a highly attractive market for artificial intelligence-based service providers, whether developed by domestic businesses or multinational technology companies. This large-scale adoption, if not balanced by an adequate legal framework for accountability, has the potential to place Indonesians vulnerable to losses due to AI system failures, without a clear and accessible legal remedy.¹¹

Based on the above description, this article formulates two main issues that will be examined in depth. First, to what extent conventional legal liability doctrines—both criminal and civil—are able to cover the losses caused by artificial intelligence systems in modern legal systems, and what conceptual challenges arise from the autonomous and opaque characteristics of such technology. Second, how comparative regulatory frameworks in the European Union, the United States, and Singapore can provide normative lessons for reconstructing a relevant model of AI legal accountability for application in the Indonesian legal system. The purpose of this research is to provide a comprehensive conceptual mapping of the issue of AI legal accountability and to formulate policy recommendations that can serve as a reference for lawmakers in Indonesia in developing a responsive, adaptive, and equitable artificial intelligence regulatory framework.

⁷Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act), 2024 O.J. (L 1689).

⁸Nina Brown, "Bots Behaving Badly: A Products Liability Approach to Chatbot-Generated Defamation," *Journal of Free Speech Law* 3, no. 2 (2023): 392.

⁹Infocomm Media Development Authority, "Singapore Proposes a Framework to Foster Trusted Generative AI Development," *Siaran Pers*, 9 Oktober 2024.

¹⁰M. H. Rumulus, "Governing AI: A Narrative Review of Algorithmic Accountability and Legal Frameworks," *Legalis: Journal of Law Review* (2025).

¹¹Zuwanda, Z. S., Lubis, A. F., Solapari, N., Sakmaf, M. S., & Triyantoro, A. (2024). 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(03), 176-185. <https://doi.org/10.58812/eslhr.v2i03.283>

The significance of this study also needs to be understood in a broader context, namely the structural transformation of the legal profession itself due to the massive adoption of generative artificial intelligence. Studies on the use of large language models in legal document drafting show that while this technology can significantly improve the work efficiency of legal practitioners, it also carries new risks in the form of fabricated legal references (hallucinated citations), which, if not carefully verified, can lead to violations of professional ethics and harm to clients.¹² This phenomenon confirms that the issue of legal accountability for artificial intelligence is not only relevant for technology developers and policy makers, but also for the legal profession itself as active users of this technology, including notaries, advocates, and legal academics in Indonesia who increasingly rely on AI devices in their daily work.

Studies on the position of artificial intelligence as a legal subject in the Indonesian positive legal system have also emerged in recent years, with conclusions consistently confirming that AI has not been and cannot be categorized as an independent legal subject within the framework of Indonesian civil law or public law, considering that the concept of a legal subject in the continental legal tradition adopted by Indonesia requires the capacity to act (*rechtsbevoegdheid*) inherent in humans and legally recognized legal entities.¹³ The implication is that any legal action involving an AI system must ultimately be traceable to the human legal subject or legal entity behind it, whether as the developer, owner, or user of the system. This framework serves as the methodological starting point for this research in examining doctrinal challenges and formulating a reconstruction of the legal accountability model in the discussion section.

This article is systematically organized into five main sections. The first section is an introduction that outlines the background, problem formulation, and objectives of the research, as outlined above. The second section explains the research methods used. The third section, which constitutes the core discussion, is divided into two subsections: the first examines the conceptual and doctrinal challenges of legal accountability for artificial intelligence in modern legal systems, while the second presents a comparison of regulatory frameworks across jurisdictions and formulates a reconstruction of a legal accountability model relevant to Indonesia. The fourth section contains conclusions and policy recommendations, while the fifth section contains a bibliography that serves as references for the entire analysis in this article.

METHODOLOGY

RESEARCH METHODS

This research uses a normative legal research method with a qualitative paradigm, which is based on a study of legal norms, legal principles, and legal doctrines relevant to legal responsibility for artificial intelligence.¹⁴ Normative legal research was chosen because the focus of this study is on the coherence of the positive legal norm system and the gap between the prevailing norms and technological developments occurring in the field, not on the empirical social behavior of society. This research employs three complementary approaches. First, a statutory approach is used to examine relevant laws and regulations, both in Indonesia such as the Electronic Information and Transactions Law, the Personal Data Protection Law, the Criminal Code, and the Civil Code and international and foreign legal instruments, particularly

¹²Amy B. Cyphert, "A Human Being Wrote This Law Review Article: GPT-3 and the Practice of Law," *UC Davis Law Review* 55, no. 1 (2021): 401.

¹³F. Jaya dan W. Goh, "Analisis Yuridis terhadap Kedudukan Kecerdasan Buatan atau Artificial Intelligence sebagai Subjek Hukum pada Hukum Positif Indonesia," *Supremasi Hukum* 17, no. 2 (2021): 4.

¹⁴Nasman, Pudji Astuti, dan Dita Perwitasari, "Etika dan Pertanggungjawaban Penggunaan Artificial Intelligence di Indonesia," *Rewang Rencang: Jurnal Hukum Lex Generalis* 5, no. 10 (2024): 6.

the European Union's Artificial Intelligence Act. Second, a comparative approach is used to compare regulatory models and doctrinal approaches to AI legal liability between the European Union, the United States, Singapore, and Indonesia, in order to identify similarities, differences, and potential adaptations to national legal contexts. Third, a conceptual approach is used to analyze fundamental legal concepts such as legal subject, fault, causality, and strict liability in relation to the technical characteristics of autonomous and self-learning artificial intelligence.

The legal materials used in this study consist of primary, secondary, and tertiary legal materials. Primary legal materials include national laws and foreign/international legal instruments, as mentioned above. Secondary legal materials include books, national and international scientific journals published in the last five years (2021–2026), research results, and publications by think tanks and international law firms addressing the issue of legal accountability in artificial intelligence. Tertiary legal materials include legal dictionaries and legal encyclopedias, which are used to clarify technical terminology. The legal materials were collected through library research, while the analysis was conducted descriptively and qualitatively using systematic and comparative interpretation techniques to produce a coherent legal construction and applicable policy recommendations.

As an additional methodological note, this study also considers the limitations of normative studies in addressing the rapidly evolving technical dynamics of artificial intelligence. The secondary legal materials used are limited to scientific publications published within the last five years to ensure the resulting analysis remains relevant to contemporary technological and regulatory developments, given that the AI legal frameworks in various jurisdictions including the European Union and Indonesia—have undergone quite dynamic updates during that period. The researchers are fully aware of this limitation, and therefore the recommendations produced in this study serve as an initial normative foundation that needs to be continuously refined as technology and regulatory practices evolve in the future. The legal material analysis technique in this study was carried out in three stages. The first stage is an inventory of legal materials, namely collecting all laws and regulations, court decisions, and academic literature relevant to the topic of legal accountability for artificial intelligence. The second stage is systematization, namely classifying the collected legal materials based on legal doctrine categories (criminal, civil, state administration) and jurisdictions (Indonesia, the European Union, the United States, Singapore). The third stage is interpretation and synthesis, namely analyzing the legal materials critically to identify norm gaps, inconsistencies, and opportunities for cross-jurisdictional adaptation, which are ultimately used to formulate a reconstruction of the legal accountability model as presented in the results and discussion section.

RESULTS AND DISCUSSION

Conceptual and Doctrinal Challenges of Legal Liability for Artificial Intelligence in Modern Legal Systems

The doctrine of legal responsibility, both in the realm of criminal law and civil law, has historically been built on an anthropocentric foundation that assumes legal subjects as rational entities possessing free will and moral awareness. In criminal law, the principle of *actus non facit reum nisi mens sit rea* is an absolute prerequisite that an act can only be categorized as a crime if it is accompanied by an inner attitude of guilt of the perpetrator. The problem is, artificial intelligence systems even if capable of producing output that functionally resembles human decision-making do not possess the consciousness, will, or moral capacity to understand the unlawful nature of their actions.¹⁵ Consequently, when an AI system 'performs'

¹⁵Kmail, "The Suitability of Criminal Liability Rules for Artificial Intelligence," 5.

an act that objectively meets the elements of a crime for example, generating defamatory content, manipulating the market through an automated trading algorithm, or causing a fatal accident through an autonomous vehicle system it becomes impossible to directly apply the conventional mens rea doctrine to that system.

To address this impasse, the comparative criminal law literature has developed a number of alternative theories. The first theory is perpetration-by-another liability, which treats AI systems as instruments or 'material agents' controlled by their developers or users as 'intellectual agents', placing criminal responsibility solely on the human agents behind the systems.¹⁶ The second theory is natural probable consequence liability, which imposes liability on developers or operators if the harm is a reasonably foreseeable consequence of the design or training of the AI system. The third, more controversial, theory is direct liability, which posits the possibility of imposing criminal liability directly on the AI entity itself through the construct of 'electronic personhood' an idea proposed by the European Parliament in 2017 but widely rejected by the academic community as it could act as a 'liability shield' for developers and technology corporations that actually benefit economically from the systems.¹⁷

In the realm of civil law, the challenges faced are no less complex. The doctrine of fault-based liability requires proof of fault (intentional or negligent), damages, a causal relationship, and an unlawful nature. However, the black-box nature of deep learning systems makes it extremely difficult for plaintiffs—who typically have limited access to technical information—to prove fault or the causal chain between the algorithm's design and the damages they experienced.¹⁸ This evidentiary difficulty is known in the literature as 'information asymmetry' or structural information asymmetry between technology developers and victims, which in turn has prompted various jurisdictions to consider shifting the burden of proof (reversal of burden of proof) or even imposing strict liability on developers and operators of high-risk AI systems.

The product liability approach traditionally applied to conventional manufactured goods also faces structural limitations when applied to AI systems. Classic product liability doctrine assumes products are static entities whose defects can be identified at the point of manufacture. In contrast, AI systems—particularly those utilizing continuous learning—can change their characteristics and behavior over time after they are marketed, so that the "defect" that causes harm may not emerge until long after the product has left the direct control of the original manufacturer.¹⁹ This situation demands a reconceptualization of when an AI product is considered 'defective', whether at the time of algorithm design, at the time of model training with specific data, or at the time of deployment and its interaction with a dynamic operational environment.

The doctrine of vicarious liability, which in conventional civil law systems imposes responsibility on a superior for the actions of his subordinates (*respondeat superior*) or on the owner of goods under his control, offers one of the most promising solutions to address losses resulting from AI systems, as this doctrine essentially does not require fault on the part of the party charged with responsibility, but rather requires a control relationship between that party and the source of the loss. In the AI context, this control

¹⁶ Hutapea, N. M. S., Sitepu, D. K. C., Damanik, J., & Sianipar, S. K. L. (2026). Artificial Intelligence and Criminal Liability: A Preliminary Study within the Indonesian Legal System. *JJHK*, 7(2), 688-704. <https://doi.org/10.46924/jihk.v7i2.330>

¹⁷Piotr Staszkiwicz et al., "Artificial Intelligence Legal Personality and Accountability: Auditors' Accounts of Capabilities and Challenges for Instrument Boundary," *Meditari Accountancy Research* 32, no. 7 (2024): 123.

¹⁸Piotr Staszkiwicz et al., "Artificial Intelligence Legal Personality and Accountability: Auditors' Accounts of Capabilities and Challenges for Instrument Boundary," *Meditari Accountancy Research* 32, no. 7 (2024): 123.

¹⁹Nina Brown, "Bots Behaving Badly: A Products Liability Approach to Chatbot-Generated Defamation," *Journal of Free Speech Law* 3, no. 2 (2023): 392.

relationship can be reconstructed between the system developer or operator and the output produced by the system, as long as the developer or operator has the ability to control the parameters, training data, and context of use of the AI system in question. However, the application of this doctrine becomes more complicated when AI systems are developed through a supply chain involving multiple parties—from training data providers and foundation model developers to third parties who fine-tune specific applications—thus, identifying the party legally possessing relevant 'control' becomes increasingly complex and requires a more detailed contractual and regulatory framework.

Another equally important issue is the issue of algorithmic bias and hidden discrimination in automated decision-making processes. When AI systems are trained using historical data containing structural biases—for example, past court rulings reflecting disparities in treatment of certain groups—the system has the potential to replicate and even reinforce those biases on a much more massive and subtle scale.²⁰ Research in cognitive neuroscience and judicial modeling shows that the application of predictive algorithms in judicial decision-making, such as recidivism risk assessments, requires strict oversight mechanisms to prevent the judge's conscientious judgment from being replaced by statistical determinism that is not fully transparent to those affected. This emphasizes that the issue of AI accountability is not merely a technical one, but also a matter of substantive justice and human rights protection.

In the context of state administrative law, accountability issues also arise when public institutions use AI systems to support administrative decision-making, such as determining eligibility for social assistance, assessing risks in financial oversight, or automating licensing processes.²¹ When administrative decisions generated or supported by AI systems harm citizens, the question of who can be sued—whether the official who signed the decision, the agency operating the system, or the third-party technology developer—becomes complicated when the decision-making process is actually dominated by algorithmic recommendations that are factually difficult for authorized officials to challenge or correct. The principle of accountability in state administrative law requires clarity regarding the responsible party (accountable actor), but automated decision-making has the potential to blur the lines of accountability, a phenomenon referred to in governance literature as 'accountability diffusion'.²²

In the Indonesian context, the absence of a specific legal regime governing AI accountability requires addressing the aforementioned issues through extensive interpretation of legal norms not designed for this context. The Electronic Information and Transactions Law, for example, regulates the responsibilities of electronic system administrators in general but does not specifically address the autonomy and self-learning characteristics characteristic of generative AI and contemporary predictive algorithms.²³ The development of national criminal law through the enactment of Law Number 1 of 2023 concerning the new Criminal Code is also relevant to be studied in this context, particularly the provisions regarding corporate criminal liability, which recognize corporations as subjects of criminal law that can be held accountable through their managers or controlling parties. This legal construction of corporate liability has the potential to be

²⁰N. Zhang dan Z. Zhang, "The Application of Cognitive Neuroscience to Judicial Models: Recent Progress and Trends," *Frontiers in Neuroscience* 17 (2023).

²¹N. Tomažević, E. Murko, dan A. Aristovnik, "Organisational Enablers of Artificial Intelligence Adoption in Public Institutions: A Systematic Literature Review," *Central European Public Administration Review* 22, no. 1 (2024): 112.

²²Widjaja, G. (2026). 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(2), 168-182. <https://doi.org/10.5281/zenodo.20045708>

²³A. Hadi dan B. Guntara, "Pembaharuan Hukum Nasional dalam Upaya Perlindungan Data Pribadi di Era Disrupsi Kecerdasan Buatan (Artificial Intelligence)," *Jurnal Hukum Mimbar Justitia* 8, no. 1 (2022): 240.

adapted analogously to cover criminal liability for losses caused by AI systems developed and operated by legal entities, with technology corporation managers remaining the parties that can be held criminally responsible when negligence in the design, testing, or supervision of the AI system is proven to be the cause of the loss. However, this analogical construction has not been explicitly tested in Indonesian judicial practice and requires further confirmation through specific regulations to avoid creating legal uncertainty in its application.

From a consumer protection law perspective, Law Number 8 of 1999 concerning Consumer Protection is also relevant for review in relation to AI-based products and services marketed to consumers in Indonesia. The principle of strict liability adopted by Article 19 of the law for losses caused by traded goods and/or services can actually serve as an initial normative basis for imposing responsibility on business actors providing AI-based services, as long as consumer losses can be proven to arise from the use of those services. However, the application of this provision to AI systems faces the same obstacles as those outlined above, namely the difficulty of proving causality due to the opaque nature of algorithms. Therefore, without strengthening through more detailed technical provisions regarding transparency obligations and algorithm audits, consumer protection against losses caused by AI has the potential to remain at a normative level that is difficult to implement effectively.

Likewise, the Civil Code, which regulates unlawful acts (Article 1365 of the Civil Code) and liability for the actions of individuals or objects under its control (Article 1367 of the Civil Code), requires analogical interpretation, which does not necessarily provide adequate legal certainty for victims or technology entrepreneurs.²⁴ This lack of specific regulations is a key argument for the need for comprehensive legislative reform, as will be discussed further in the next subsection.

The issue of AI legal accountability also intersects with the protection of privacy rights and personal data, particularly in the context of the rise of deepfake technology and digital content manipulation based on generative artificial intelligence. Recent studies have shown that deepfake technology, which can create fake audio and visual recordings that convincingly resemble a person's identity, has given rise to new forms of privacy violations that are difficult to address under conventional privacy law frameworks, including the potential for misuse for defamation, fraud, and digital blackmail.²⁵ The characteristics of deepfakes that are difficult to distinguish from original recordings by the eyes and ears of ordinary humans demand the existence of new digital forensic evidence standards, while also emphasizing the urgency of regulating legal responsibility for platform developers who enable the misuse of this technology, not solely imposing responsibility on the end users who misuse it.

Another dimension that needs to be considered in constructing the doctrine of AI legal liability is the context of human rights law, particularly when AI systems are applied in situations that impact vulnerable groups. A comparative study of the application of AI in the context of protecting the rights of victims of displacement due to climate change-induced disasters shows that the operationalization of artificial intelligence in decision-making that directly impacts the fulfillment of human rights requires a higher precautionary principle than the application of AI in the ordinary commercial sector, considering that the

²⁴ Asri, D. P. B., Thaher, I., & Widayanti, R. (2025). Artificial intelligence, legal culture, and the Indonesian formal legal system: negotiating norms in the regulation of emerging technologies. *Journal of Cultural Analysis and Social Change*, 457-468. <https://doi.org/10.64753/jcasc.v10i3.2439>

²⁵ K. Verma, "Digital Deception: The Impact of Deepfakes on Privacy Rights," *Lex Scientia Law Review* 8, no. 2 (2024): 862.

consequences of system failure can be fatal and irreversible for affected groups.²⁶ This precautionary principle is relevant to adopt in the Indonesian context, particularly for the application of AI in sectors that directly affect the interests of the public and vulnerable groups, such as the justice system, healthcare, and disaster mitigation.

In closing this sub-chapter, it can be emphasized that the conceptual and doctrinal challenges outlined above whether in the criminal, civil, or administrative realms essentially stem from the same fundamental issue: the inconsistency between the anthropocentric assumptions underlying classical legal doctrine and the autonomous, opaque, and adaptive characteristics of contemporary artificial intelligence systems.²⁷ This doctrinal gap cannot be resolved solely through extensive interpretation of existing legal norms, but rather requires legislative intervention specifically designed to address the unique characteristics of this technology. The discussion in the following sub-chapter will examine how various jurisdictions have responded to this need for legislative intervention, providing a comparative basis for reconstructing a model of legal accountability appropriate to the Indonesian context.

Comparison of Regulatory Frameworks and Reconstruction of Artificial Intelligence Legal Accountability Models: Perspectives from the European Union, the United States, and Indonesia

The European Union is the most progressive jurisdiction in responding to the challenges of AI legal accountability through the establishment of Regulation (EU) 2024/1689 on Artificial Intelligence Act, which was adopted on 13 June 2024 and became effective gradually from 1 August 2024.²⁸ This regulatory framework adopts a risk-based approach that classifies AI systems into four levels: unacceptable risk, which is absolutely prohibited, such as social scoring systems and cognitive manipulation techniques; high risk, which includes AI systems used in critical infrastructure, employment, law enforcement, and the judiciary; limited risk, which requires transparency, such as notification of interactions with chatbots or AI-generated content; and minimal risk, which is not subject to specific obligations.²⁹ For high-risk systems, the Artificial Intelligence Act requires the implementation of a risk management system, verified training data quality, detailed technical documentation, transparency to users, human oversight mechanisms, and post-market monitoring, along with significant administrative sanctions for violations.³⁰

This risk-based approach has the conceptual advantage of not treating all AI systems uniformly, but rather allocating the intensity of legal obligations proportionally to the potential harm they pose. This approach is consistent with the principle of proportionality commonly adopted in modern administrative law, while also avoiding over-regulation of low-risk innovations that could actually hinder the growth of the digital economy.³¹ However, the implementation of this approach has also faced criticism, particularly regarding the complexity of risk classification which requires significant institutional capacity and supervisory resources, a challenge that is potentially more difficult for developing countries with limited regulatory infrastructure such as Indonesia.

²⁶N. Ahmad, "Climate Change-Induced Disaster Displacement and Law in India: Positioning the Operationalization of Artificial Intelligence for Protecting Human Rights," dalam Ekaputra Fitrianto (ed.), *Law and AI in Asia* (Singapore: Springer, 2024), 125.

²⁷ Saputra, R. D. (2025). Legal Liability for Artificial Intelligence Decisions in the Indonesian Judicial System. *Veteran Law Review*, 8(2), 182-192. <https://ejournal.upnvj.ac.id/Velrev/article/view/12549>

²⁸Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act), 2024 O.J. (L 1689).

²⁹Regulation (EU) 2024/1689, Recital 1 dan Pasal 6.

³⁰Baker McKenzie, "EU Regulation on AI."

³¹Baker McKenzie, "EU Regulation on AI," Insight, 2025.

Unlike the European Union, the United States currently lacks comprehensive federal legislation governing artificial intelligence. The emerging approach in the United States is more sectoral and fragmented, relying on a combination of state-level regulation, enforcement based on the authority of existing regulatory agencies like the Federal Trade Commission, and the development of jurisprudence through civil litigation related to product liability and negligence.³² A number of legal cases involving autonomous vehicle systems and generative language models that produce false information (hallucinations) and defamatory content are beginning to establish precedents regarding the limits of technology developers' liability for the output of the AI systems they create.³³ These developments in the realm of litigation demonstrate that in the common law legal system, the doctrine of product liability and negligence can evolve incrementally through court decisions without having to wait for the formation of new laws, a characteristic that is fundamentally different from the continental legal system adopted by Indonesia and which relies heavily on the certainty of written norms.

Meanwhile, research on the use of AI in legal practice and access to justice in the United States demonstrates the technology's significant potential to expand the reach of legal aid for disadvantaged communities, while also raising concerns about the quality and accuracy of legal advice produced without adequate professional oversight.³⁴ Another study highlights the shifting role of the legal profession itself amidst the adoption of generative AI, which demands a redefinition of the professional standard of care for advocates who use AI tools in their practice, including the obligation to verify the output generated by the system before it is used in litigation.³⁵ This phenomenon is relevant for Indonesia considering that the use of generative AI in legal practice, including by notaries, advocates, and legal academics, has also experienced a significant increase, but has not been balanced by ethical guidelines and professional standards that explicitly regulate the limits of responsibility for its use.³⁶

Singapore has taken a third path that differs from the European Union and the United States, namely through a voluntary guidelines-based governance approach (soft law governance) as outlined in the Model AI Governance Framework published by the Infocomm Media Development Authority.³⁷ This framework is not legally binding, but is designed to provide practical guidance for businesses in applying the principles of transparency, fairness, and accountability in the development of AI systems, along with incentives for compliance through certification and industry recognition. Singapore's approach reflects a more flexible and adaptive regulatory strategy to the speed of technological innovation, although it also raises questions about the effectiveness of enforcement when violations cause real harm to society.

Unlike these three jurisdictions, Indonesia currently lacks a legal framework that specifically and comprehensively regulates accountability for artificial intelligence. The Ministry of Communication and Informatics has published the Indonesian National Artificial Intelligence Strategy 2020–2045 as a long-

³²Amy B. Cyphert, "A Human Being Wrote This Law Review Article: GPT-3 and the Practice of Law," *UC Davis Law Review* 55, no. 1 (2021): 401.

³³Nina Brown, "Bots Behaving Badly: A Products Liability Approach to Chatbot-Generated Defamation," *Journal of Free Speech Law* 3, no. 2 (2023): 392.

³⁴Colleen V. Chien dan Miriam Kim, "Generative AI and Legal Aid: Results from a Field Study and 100 Use Cases to Bridge the Access to Justice Gap," *Loyola of Los Angeles Law Review* (2024, forthcoming).

³⁵Jonathan H. Choi, Amy Monahan, dan Daniel Schwarcz, "Lawyering in the Age of Artificial Intelligence," *Minnesota Law Review* (2024, forthcoming).

³⁶Maskanah, U. (2025). Artificial intelligence in civil justice: comparative legal analysis and practical frameworks for Indonesia. *Jambura Law Review*, 7(1), 225-242. <https://doi.org/10.33756/jlr.v7i1.27786>

³⁷Infocomm Media Development Authority, "Singapore Proposes a Framework to Foster Trusted Generative AI Development," *Siaran Pers*, 9 Oktober 2024.

term policy roadmap³⁸ and Circular Letter Number 9 of 2023 concerning the Ethics of Artificial Intelligence, which contains nine ethical values that must be considered in the development and utilization of AI, including the principles of transparency, accountability, and protection of personal data.³⁹ However, both instruments are purely policy and ethical, not binding legal norms enforceable through judicial mechanisms. The binding regulations, namely the Electronic Information and Transactions Law and the Personal Data Protection Law, as described in the previous subchapter, only indirectly regulate AI through general principles of responsibility for electronic system administrators and personal data protection, without containing specific provisions regarding algorithm audits, bias mitigation, transparency of automated decision-making processes, or compensation mechanisms for victims of losses caused by AI systems.⁴⁰

Based on the comparative mapping above, this study reconstructs a hybrid model of AI legal accountability that can be adapted to the context of the Indonesian legal system, with four main pillars. The first pillar is the implementation of tiered responsibility based on the level of risk (risk-tiered liability), adopting the spirit of the European Union approach but adapted to Indonesia's institutional capacity, where high-risk AI systems — such as those used in the judicial system, healthcare, and the financial sector — are subject to strict liability standards for their developers and operators, while low-risk systems remain subject to the existing principle of fault-based liability. The second pillar is the obligation to regularly audit algorithms by an independent, certified institution, to ensure transparency in the decision-making process and detect potential bias early, as has been practiced in the accountability audit framework developed in the audit profession and corporate governance.⁴¹

The third pillar of the reconstructed model is the obligation of humans-in-the-loop, or the involvement of substantive human oversight—not merely an administrative formality—in any automated decision-making that significantly impacts individual rights, particularly in the realms of justice, law enforcement, and public services, so that the final decision remains under the control and responsibility of humans who can be held directly accountable by law.⁴² The fourth pillar is the establishment of a special compensation mechanism, either through a mandatory insurance scheme for developers of high-risk AI systems or the establishment of a collective compensation fund, to address situations where identifying individually responsible parties is difficult due to the complexity of the development and operational chain of AI systems involving many parties. These four pillars, if integrated into a special bill on artificial intelligence or through revisions to the Electronic Information and Transactions Law, are expected to close the accountability gap that has been a fundamental problem in the interaction between law and artificial intelligence technology in Indonesia.⁴³

In addition to these four substantive pillars, strengthening institutional capacity is also a prerequisite for the successful implementation of an AI legal accountability model. The establishment of an independent supervisory authority with the authority to supervise, investigate, and impose administrative sanctions for

³⁸Kementerian Komunikasi dan Informatika Republik Indonesia, Strategi Nasional Kecerdasan Artifisial Indonesia 2020–2045 (Jakarta: Kominfo, 2020), sebagaimana dirujuk pada pembaruan kebijakan tahun 2023–2024.

³⁹Surat Edaran Menteri Komunikasi dan Informatika Republik Indonesia Nomor 9 Tahun 2023 tentang Etika Kecerdasan Artifisial.

⁴⁰Nasman, Pudji Astuti, dan Dita Perwitasari, "Etika dan Pertanggungjawaban Penggunaan Artificial Intelligence di Indonesia," *Rewang Rencang: Jurnal Hukum Lex Generalis* 5, no. 10 (2024): 6.

⁴¹Staszkievicz et al., "Artificial Intelligence Legal Personality and Accountability," 130.

⁴²Hidayat, W., & Muis, A. (2025). Ethical and Legal Challenges of Artificial Intelligence in the Judicial System: An Indonesian Perspective. *Justicia Insight*, 2(1), 9-15. <https://doi.org/10.70716/justin.v2i1.274>

⁴³Rumulus, "Governing AI," 2025.

violations of AI provisions—similar to the model adopted by the European Union through the establishment of the AI Office—should be considered to ensure that law enforcement does not rely solely on civil and criminal litigation mechanisms, which are typically slow and expensive.⁴⁴ Furthermore, the implementation of regulatory sandboxes that allow testing of new AI systems in a controlled environment before they are widely marketed could be a policy instrument that balances the need for technological innovation with legal protection for the public, an approach that has begun to be adopted by both the European Union and a number of financial authorities in Southeast Asia.

The trend of artificial intelligence technology adoption in the legal services sector has also empirically shown significant acceleration in recent years. Legal industry surveys have noted an increase in the use of generative AI tools by legal practitioners for research, document preparation, and case management, although the integration of these technologies into institutional workflows remains surface-level and faces cost constraints and the complexity of in-depth data analytics.⁴⁵ These findings are relevant for Indonesia in designing a realistic transition policy, which focuses not only on establishing substantive legal norms regarding accountability, but also on strengthening the technical capacity and digital literacy of law enforcement officers, notaries, and legal academics so that they are able to utilize and monitor the use of this technology responsibly.

Redefining the standard of professional care is also a crucial element in reconstructing the AI legal accountability model, particularly for legal professions that use generative AI tools as work aids. Studies of advocacy practices in the era of artificial intelligence emphasize the need for an independent verification duty for all AI output before it is used in official legal documents, as part of an updated standard of professional care in line with technological developments.⁴⁶ This principle is in line with the spirit of the third pillar of the hybrid accountability model reconstructed in this study, namely the involvement of substantive human supervision, which ideally should be adopted into the code of ethics of the legal profession in Indonesia, including the notary code of ethics, the advocate code of ethics, and academic guidelines for writing legal scientific papers.⁴⁷

Finally, ethical aspects also serve as a crucial foundation for the reconstruction of the legal accountability model as outlined above. The ethical values formulated in Circular Letter of the Minister of Communication and Information Technology Number 9 of 2023, which encompass the principles of transparency, fairness, reliability, security, and accountability, should not remain as voluntary moral guidelines but should be transformed into binding and enforceable legal norms, as the European Union has done in transforming AI ethical principles into concrete legal obligations in the Artificial Intelligence Act.⁴⁸ This transformation from soft law to hard law is the core argument of this research in encouraging the formation of a comprehensive artificial intelligence legal framework in Indonesia.

In the context of the financial services sector, the Financial Services Authority (OJK) has developed a regulatory sandbox mechanism for financial technology innovations, including those based on artificial

⁴⁴White & Case LLP, "Long Awaited EU AI Act Becomes Law after Publication in the EU's Official Journal," 12 Juli 2024.

⁴⁵American Bar Association Journal, "2024 Year in Review: Integrated Legal AI and More Effective Case Management," ABA Journal, 2024.

⁴⁶Choi, Monahan, dan Schwarcz, "Lawyering in the Age of Artificial Intelligence."

⁴⁷Suhardi, M. (2025). Legal Accountability for the Use of Artificial Intelligence in Government Administrative Decision-Making in Indonesia. *International Journal of Scientific Research*, 2(03), 100-111. <https://doi.org/10.62894/phjend65>

⁴⁸Nasman, Astuti, dan Perwitasari, "Etika dan Pertanggungjawaban Penggunaan Artificial Intelligence di Indonesia," 9.

intelligence, as a controlled testing space before these products or services are widely marketed to the public. The experience of implementing this sandbox in the financial sector can serve as an institutional precedent that can be expanded to accommodate testing of AI systems in other high-risk sectors, such as the judiciary and healthcare, as outlined in the fourth pillar of the hybrid accountability model reconstructed in this study. This tiered approach allows supervisory authorities to gain an empirical understanding of the behavior of AI systems before formulating more detailed technical provisions, while also providing space for innovators to gradually align their products with applicable compliance standards.⁴⁹

The collective compensation scheme proposed as the fourth pillar of the hybrid accountability model could also take into account the experience of implementing compensation funds in other sectors that have already recognized the concept of absolute liability, such as the compensation fund for victims of criminal acts recognized in the Witness and Victim Protection Law. Adapting a similar model to the context of losses caused by AI systems could be realized through the establishment of a fund collected from mandatory contributions from business actors developing and operating high-risk AI systems, managed by an independent supervisory authority and accessible to victims through a claims mechanism that is simpler than conventional litigation. Such a scheme could also reduce the burden of proving causality, which has been a major obstacle for victims in obtaining justice for losses caused by complex and opaque AI systems.

It is also important to note that the reconstruction of the AI legal accountability model proposed in this study is not intended to hinder technological innovation, but rather to create legal certainty that can encourage responsible investment and development of AI technology in Indonesia. The absence of legal certainty regarding the limits of responsibility of AI system developers and operators has the potential to create a less conducive business climate, both due to business actors' concerns about the immeasurable risk of legal liability and the lack of adequate protection for consumers and the public who could potentially be harmed. Therefore, establishing a clear and proportionate legal framework for AI accountability is essentially a prerequisite for the growth of a healthy and sustainable technological innovation ecosystem in Indonesia.

In addition to the Artificial Intelligence Act, the European Union also updated its product liability framework through a revised Product Liability Directive that broadened the scope of the definition of 'product' to include software, including artificial intelligence systems, so that victims of harm caused by digital products can bring strict liability claims without the need to prove specific developer fault.⁵⁰ This kind of product liability regulatory update is important for Indonesia to consider, considering that the current Consumer Protection Law was formulated in an era when software and algorithmic systems were not yet a significant part of consumer transactions. Therefore, the definition of 'goods' and 'services' in the law potentially requires further clarification to explicitly cover artificial intelligence-based products and services, in line with the reform steps taken by the European Union.

CONCLUSIONS

Based on the discussion outlined, this study concludes two main points. First, conventional legal liability doctrine both in the criminal and civil realms—faces fundamental structural limitations when applied to losses caused by artificial intelligence systems, due to the characteristics of autonomy, algorithmic opacity, and self-learning capabilities that conventional legal objects lack. This gap gives rise

⁴⁹ Hidayat, F., & Ihsan, I. (2026). 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(1), 01-10. <https://sovereignresearch.org/lex-recta/article/view/46>

⁵⁰ White & Case LLP, "Long Awaited EU AI Act Becomes Law after Publication in the EU's Official Journal," 12 Juli 2024.

to what is known as a liability gap or accountability gap, which, if left unchecked without legislative intervention, will continue to create legal uncertainty, both for victims of losses and for businesses developing such technologies. Second, a comparison of the regulatory frameworks between the European Union, the United States, and Singapore demonstrates that no single model can be universally applied. Rather, each jurisdiction needs to formulate an approach appropriate to the characteristics of its legal system and institutional capacity. The European Union's risk-based approach provides the most comprehensive conceptual framework for Indonesia to selectively adapt. The findings of this study also confirm that the issue of legal accountability for artificial intelligence is not merely a technical-legislative issue, but rather intersects with more fundamental philosophical questions regarding the boundaries of legal subjects in the era of autonomous technology. Modern legal systems, built on centuries of anthropocentric assumptions, are now faced with new entities capable of acting functionally similar to humans without possessing the consciousness or free will required by classical legal doctrine. The choice not to grant AI the status of an independent legal subject—as repeatedly emphasized in the discussion above does not mean ignoring the issue of accountability, but rather emphasizes that legal responsibility must always be traceable back to the humans and legal entities that control, develop, or benefit from the operation of the system, in accordance with the principle that power (in this case technological power) must always go hand in hand with responsibility.

This study has several limitations that should be considered when interpreting the findings. The analysis relies primarily on previously published literature, which may vary in research design, context, and methodological quality. In addition, differences in educational settings and the types of AI technologies examined may limit the generalizability of the findings across institutions and learner groups. Future research should therefore incorporate empirical and longitudinal evidence to further validate the findings and examine the long-term effects of AI-assisted learning in diverse educational contexts.

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