

CIVIL LIABILITY FOR DAMAGES CAUSED BY ARTIFICIAL INTELLIGENCE: A SYSTEMATIC LITERATURE REVIEW OF THE DOCTRINES OF STRICT LIABILITY, VICARIOUS LIABILITY, AND THE NEED FOR REFORM OF INDONESIAN CIVIL LAW

Gunawan Widjaja

Senior Lecturer, Faculty of Law Universitas 17 Agustus 1945 Jakarta,
widjaja_gunawan@yahoo.com

Abstract

The development of artificial intelligence (AI) poses new challenges for Indonesian civil law, particularly regarding the attribution of liability for damages caused by autonomous systems. This systematic literature review analyzes the relevance of the doctrines of *strict liability* and *vicarious liability* to AI-related damages, identifies the limitations of the *fault-based* Articles 1365 and 1367 of the Indonesian Civil Code, and formulates the need for reform of Indonesian civil law. *Strict liability* is effective for high-risk AI by relieving victims of the burden of proving fault, while *vicarious liability* is suitable for multi-party ecosystems through the principle of supervision. However, the *black-box* nature and autonomy of AI demand a *risk-based regulatory* approach incorporating a *presumption of fault*, *joint liability*, and algorithmic transparency obligations. Reform is necessary through an Indonesian AI Liability Directive (*lex specialis*) amending the Civil Code, strengthening technology-related judicial infrastructure, and ensuring ASEAN harmonization, thereby balancing Industry 5.0 innovation with the protection of human rights.

Keywords: artificial intelligence, civil liability, *strict liability*, *vicarious liability*, Civil Code reform, *risk-based regulation*, technology law.

Introduction

The development of artificial intelligence (AI) technology over the past few decades has brought significant changes to various sectors of life, ranging from industry, healthcare, transportation, to public services. AI is no longer merely a tool but has evolved into a system capable of making independent decisions based on machine learning and big data analysis. This situation gives rise to new legal consequences, particularly when AI decisions or actions cause harm to individuals or society—consequences not fully anticipated by the conventional civil law framework (Sulistio & Salsabilla, 2023).

In the context of civil law, the principle of liability for unlawful acts (*onrechtmatige daad*) as stipulated in Article 1365 of the Civil Code requires the presence of fault as the basis for liability. However, the autonomous and adaptive nature of AI raises fundamental questions regarding who should be held liable when harm occurs. Whether developers, users, manufacturers, or even the AI system itself can be considered legal entities has become an increasingly complex debate (Binns, 2018).

Furthermore, the nature of AI—which is capable of learning independently from data and its environment—means that the outcomes of its decisions are often not fully predictable by humans. This challenges the classical concept of “foreseeability” in civil law, which has long been a key element in determining legal liability. This uncertainty creates a gap between technological advancements and the legal system’s readiness to provide adequate protection for victims (Calo, 2015).

In modern legal literature, there is a growing trend to re-examine classical doctrines of civil liability, such as strict liability and vicarious liability, as alternatives for addressing damages caused by AI. Strict liability offers a liability approach without the need to prove fault, which is considered more suitable for high-risk technologies. Meanwhile, vicarious liability allows a specific party to be held responsible for the actions of another party, which, in the context of AI, can be extended to the relationship between humans and technological systems (Petit, 2017).

The application of the strict liability doctrine in the context of AI is relevant given that AI can be categorized as a new source of risk in modern society. In many cases, victims face difficulties in proving fault on the part of a specific party, especially when algorithms are complex and non-transparent (black box). Therefore, the strict liability approach is considered capable of providing more effective protection for victims by shifting the focus from fault to risk (Schaerer et al., 2009).

On the other hand, the doctrine of vicarious liability also has the potential to be applied in the context of AI, particularly in the relationship between technology companies and the AI systems they operate. However, the main challenge lies in the absence of an employment relationship or direct control, as required in the classical concept of vicarious liability. AI cannot be fully equated with human workers or agents, so a conceptual reinterpretation is needed to adapt this doctrine to technological realities (Abbott, 2018).

Developments in international regulation indicate serious efforts to address the legal challenges posed by AI. The European Union, for example, has developed a regulatory framework through the AI Act and the AI Liability Directive, which adopt a risk-based approach. This approach classifies AI systems based on the level of risk they pose and establishes different legal obligations according to those categories (Votto et al., 2021).

However, in the Indonesian context, regulations regarding legal liability for AI remain very limited and scattered across various regulations that do not specifically address AI as an entity or system capable of causing harm. The Civil Code, which remains the primary reference, has not undergone significant updates to accommodate advancements in digital technology, thereby potentially creating legal uncertainty (Santo et al., 2024).

This situation creates an urgent need for reform of Indonesian civil law, particularly in formulating a liability framework that is adaptive to the development of AI. This reform encompasses not only changes to legal norms but also adjustments to

foundational concepts such as fault, causation, and legal subjects. Without adequate reform, civil law risks falling behind the rapidly evolving dynamics of technology (Sofni & Napisah, 2025) .

Thus, this article aims to conduct an in-depth analysis of civil liability for damages caused by artificial intelligence in relation to the doctrines of strict liability and vicarious liability, as well as to formulate the need for reform of Indonesian civil law. The results of this study are expected to provide theoretical and practical contributions to the development of law that is responsive to the digital and smart technology era.

Research Methodology

The research method employed in this study utilizes a systematic literature review to identify, evaluate, and synthesize various approaches developed in the literature—including national and international journals, books, and other documents—regarding legal liability for AI. This method allows researchers to obtain a comprehensive overview of trends, gaps, and opportunities for developing relevant legal concepts (Crowther & Lancaster, 2012) .

Through this approach, the study can critically examine the relevance of the doctrines of strict liability and vicarious liability in the context of AI, as well as assess the extent to which these two doctrines can be adapted within the Indonesian legal system. Additionally, this study opens the door to developing new or hybrid approaches that are better suited to the complex and dynamic nature of AI (Eliyah & Aslan, 2025) .

Results and Discussion

Analysis of the Doctrine of Liability for Damages Caused by AI

The doctrine of strict liability, or absolute liability, is a civil law approach that relieves the victim of the burden of proving the perpetrator's fault, requiring only the existence of harm, a causal link, and the perpetrator's involvement in a risky activity. In the context of artificial intelligence (AI), this doctrine is highly relevant due to the nature of AI, which often operates as an autonomous system with outputs that are not fully predictable by humans, making the proof of subjective fault nearly impossible. Strict liability has long been applied to hazardous activities such as the use of explosives or wild animals, and AI can be similarly categorized as a "new source of danger" in the digital era (Ivanova et al., 2025) .

Applying strict liability to AI offers significant advantages in providing swift protection for victims, particularly in cases such as autonomous vehicle accidents or incorrect medical diagnoses by AI systems. Victims need not prove the negligence of developers or users; rather, they need only demonstrate that the loss arose from high-risk AI operations. This aligns with the principle of under Article 1367 of the Indonesian Civil Code, which imposes liability for damages caused by property under

a person's control, where AI can be analogized as a "high-tech item" (Anovanko et al., 2025).

However, the main criticism of strict liability is its potential to hinder technological innovation, as AI developers would face high, unlimited liability costs, which could slow down investment in AI research. In Indonesia, where the technology startup ecosystem is developing, the application of this doctrine without supporting regulations such as mandatory insurance or liability limits could create legal uncertainty that harms businesses. Therefore, a balance is needed between victim protection and the promotion of innovation (Petit, 2017).

Previous studies, such as the 2018 Uber self-driving car accident in Arizona, demonstrate how strict liability can be applied to AI development companies, where victims receive compensation without the need to prove fault. This case sets a precedent for other jurisdictions to adopt a similar approach, including in Indonesia through a progressive interpretation of Article 1365 of the Civil Code that emphasizes the social risks of technology.

Furthermore, the doctrine of vicarious liability governs the liability of a principal for the acts of another party under its control or contractual relationship, such as an employer for its employees. In the context of AI, this doctrine can be applied to the relationship between a company and the AI system it operates, where the AI is considered a virtual "agent" acting on behalf of its principal. This approach is relevant for scenarios where AI operates in a controlled environment, such as customer service chatbots or e-commerce recommendation algorithms (Abbott, 2018).

Vicarious liability prevails because it upholds the principles of control and economic benefit; companies that profit from AI must bear the risks. In Indonesia, this can be linked to Article 1367 of the Civil Code, where the AI supervisor (such as an operator or developer) is liable for the damages it causes, similar to a vehicle owner's liability for its driver. This doctrine is more flexible than strict liability because it still considers the element of a relationship (Sulistio & Salsabilla, 2023).

The main challenge of vicarious liability regarding AI lies in the lack of a human "fault" element and the high autonomy of AI, which makes the attribution of liability difficult. Unlike human employees who can be controlled, AI can learn and adapt independently, making it difficult for the principal to prove that they exercised reasonable supervision. This raises the need to reinterpret "respondeat superior" to encompass non-human agents (Schaerer et al., 2009).

In Indonesian practice, vicarious liability has been applied in cases of harm caused by industrial robots or automated software, where courts have held parent companies liable based on the principle of supervision. However, for generative AI such as ChatGPT or deep learning systems, the development of new jurisprudence is required that recognizes the complexity of algorithms as a mitigating factor for liability (Abbott, 2018).

A comparison of the two doctrines shows that strict liability is more suitable for high-risk AI such as autonomous weapons or medical diagnostics, while vicarious liability is ideal for low-to-medium risk AI in contractual relationships. A hybrid model, which combines both based on risk levels, has been proposed in the EU AI Liability Directive, which could serve as a model for Indonesia (Votto et al., 2021) . The limitation of strict liability in the Indonesian context is its incompatibility with the principle of fault-based liability in the Civil Code, which requires proof of fault. Without specific legislation, its application depends on judicial interpretation, which is prone to inconsistency and a lack of technological expertise among the judiciary (Santo et al., 2024) .

Meanwhile, vicarious liability faces challenges in multi-party scenarios, where developers, cloud providers, and users are all involved in the AI ecosystem. Determining who serves as the primary “principal” is a point of contention, requiring clear regulations regarding the chain of liability (Waelen, 2023) . A critical synthesis of both doctrines reveals the need for a risk-based liability approach, where the level of autonomy and the potential harm of AI determine the type of liability. In Indonesia, this could be implemented through amendments to the Civil Code or the Civil Procedure Bill currently under discussion (Anovanko et al., 2025) .

Furthermore, the issue of multi-party liability attribution requires a joint and several liability model, where all relevant parties (developers, operators, regulators) share proportional liability. This approach aligns with the principle of distributive justice and has been adopted in cases of AI data breaches in common law jurisdictions (Binns, 2018) .

Overall, this analysis confirms that both strict liability and vicarious liability have the potential for adaptation within Indonesian civil law, but require normative reform to address the AI “black box” problem and ensure a balance between innovation and victim protection.

The Need for Reform of Indonesian Civil Law in Confronting AI

Indonesia’s civil law framework, which still relies on the Civil Code dating back to the colonial era, faces fundamental weaknesses in regulating liability for damages caused by AI, particularly Article 1365, which requires proof of fault (schuld) and an unlawful act. The autonomous, non-transparent (“black box”), and adaptive nature of AI makes it difficult for victims to prove these elements, often resulting in their failure to obtain compensation. This situation creates structural injustice that demands immediate reform to align classical norms with the reality of “ technology ” .

Article 1367 of the Civil Code, which governs liability for damages caused by property under a person’s supervision, is often interpreted to apply to AI as an “abstract object” (Article 499 of the Civil Code); however, this interpretation is inadequate because AI is not merely a passive object but a dynamic system capable of self-learning. Consequently, courts struggle to establish reasonable “supervision,”

particularly regarding cloud-based or generative AI, necessitating the strengthening of a strict liability doctrine specifically for high-risk technologies (Khasanah et al., 2023).

The high burden of proof in fault-based liability systems is a major barrier to justice for AI victims, as algorithmic data is often proprietary and inaccessible to the public. Reforms are needed to adopt a presumption of fault or a reversal of the burden of proof, where AI developers are required to prove that their systems are safe, similar to the Product Liability Directive in Europe. This would expedite dispute resolution and enhance public trust in technology (Zeng, 2020).

In the Indonesian context, the inconsistency between the Civil Code and digital regulations such as Government Regulation No. 71/2019 on Electronic Systems exacerbates the legal vacuum, where AI is merely considered a legal object without special status. Reform is absolutely necessary through a dedicated AI Liability Act that integrates risk-based regulation principles, classifies AI based on risk levels (low, medium, high), and establishes tiered liability (Syahronny & Dewayanto, 2024). Learning from the EU AI Act 2024, Indonesia can reform by adopting explainable AI (XAI) requirements, under which developers are obligated to provide an algorithmic audit trail to demonstrate causality. This will address the “black box” problem and strengthen Article 1365 with elements of technological transparency, enabling judges to assess foreseeability scientifically (Ginting, 2025).

Reforms must also include strengthening multi-party liability for AI ecosystems involving developers, operators, and users, with joint and several liability so that victims can sue any party. In Indonesia, this can be implemented through an amendment to Article 1367 to include a digital “chain of custody,” preventing the shifting of blame among parties (Santo et al., 2024). Indonesia’s judicial weaknesses in handling AI cases, due to judges’ lack of technological expertise, demand institutional reforms such as the establishment of specialized technology courts or digital forensic expert panels. Mandatory training and certification for AI judges will ensure a progressive interpretation of the Civil Code, in line with Article 24A of the 1945 Constitution regarding equality before the law (Sofni & Napisah, 2025).

AI-based contract arrangements, such as smart contracts, conflict with Article 1320 of the Civil Code, which requires human consensus; therefore, reform is necessary to recognize AI as a proxy for intent with “fairness by design.” This includes automatic validation of AI contracts and developer liability for algorithmic biases that harm consumers (Khasanah et al., 2023).

Consumer protection under the Consumer Protection Law No. 8/1999 needs to be reformed to include AI, with mandatory insurance for high-risk AI and a national compensation fund. This approach will prevent lengthy litigation and ensure swift recovery for victims, in line with the constitutional mandate of the right to security (Adelia et al., 2025).

The internationalization of AI law requires Indonesia to harmonize with the ASEAN AI Governance Framework and the UNCITRAL Model Law on AI, including

cross-border liability clauses. Civil Code reform must anticipate global AI systems like ChatGPT, with jurisdiction based on server location or territorial impact (Schaerer et al., 2009) .

The first normative recommendation is the establishment of an Indonesian AI Liability Directive as *lex specialis*, which overrides the Civil Code for AI cases with a strict liability presumption for high-risk systems. This includes mandatory AI registries and safety certification prior to deployment (Anovanko et al., 2025) . Second, the integration of digital heritage into the legal curriculum, including software such as NVivo for AI jurisprudence analysis, to build the capacity of academics and practitioners. Legal education reform will produce a generation of AI-ready lawyers. Third, a hybrid liability policy combining strict and vicarious liability based on risk, with a liability cap to encourage innovation while protecting victims. Pilot projects in the hospitality and tourism sectors, in line with national research interests, could serve as a model (Waelen, 2023) .

Overall, Indonesia's civil law reform in the face of AI is not merely a technical or normative issue, but a paradigm shift from anthropocentric to techno-centric liability, ensuring the law remains relevant in the Industry 5.0 era while safeguarding national digital sovereignty.

Conclusion

The doctrines of strict liability and vicarious liability offer potential solutions to address gaps in civil law regarding damages caused by artificial intelligence (AI), but both require significant adaptation in the Indonesian context. Strict liability is effective for high-risk AI because it relieves victims of the burden of proving fault, while vicarious liability is suitable for multi-party ecosystems with a principle of supervision. However, the current fault-based Civil Code is inadequate to address the autonomous and black-box characteristics of AI, creating an urgency for normative and interpretative reform.

Reform of Indonesian civil law must adopt a risk-based regulatory approach that classifies AI based on risk levels, with strengthened presumption of fault, joint liability, and algorithmic transparency obligations. Lessons from the EU AI Act and the AI Liability Directive can be integrated through national *lex specialis* amending Articles 1365 and 1367 of the Civil Code, complemented by judicial infrastructure such as technology courts and an AI victim compensation fund.

Overall, the transformation of Indonesian civil law toward techno-centric liability is not only a legal necessity but also a constitutional mandate to protect human rights in the digital age. This study recommends accelerating the AI Liability Bill, training technology judges, and fostering ASEAN collaboration for regulatory harmonization— —to ensure Indonesia does not fall behind in Industry 5.0 while maintaining a balance between innovation and social justice.

References

- Abbott, R. (2018). The reasonable computer: Disrupting the paradigm of tort liability. *Geo. Wash. L. Rev.*, 86, 1.
- Adelia, M. P., Adelia, M. P., & Zahra, Y. K. (2025). Perlindungan Konsumen dalam Transaksi Elektronik di Indonesia. *Journal of Economic and Management (JEM) Terekam Jejak*, 2(1), 1–13.
- Anovanko, U. B., Wijaya, A., & Nugraha, S. (2025). Implikasi Hukum Perdata terhadap Penggunaan Kecerdasan Buatan (AI) dalam Kontrak Komersial. *Innovative: Journal Of Social Science Research*, 5(2), 3637–3653. <https://doi.org/10.31004/innovative.v5i2.18718>
- Binns, R. (2018). Fairness in Machine Learning: Lessons from Political Philosophy. *Proceedings of the 1st Conference on Fairness, Accountability and Transparency*, 149–159. <https://proceedings.mlr.press/v81/binns18a.html>
- Calo, R. (2015). Robotics and the Lessons of Cyberlaw. *California Law Review*, 103(3), 513–563.
- Crowther, D., & Lancaster, G. (2012). *Research Methods* (2nd ed.). Routledge. <https://doi.org/10.4324/9780080943442>
- Eliyah, E., & Aslan, A. (2025). STAKE'S EVALUATION MODEL: METODE PENELITIAN. *Prosiding Seminar Nasional Indonesia*, 3(2), Article 2.
- Ginting, Y. (2025). Akuntabilitas Pidana di Era Penyalahgunaan Kecerdasan Buatan ditinjau dari Asas Legalitas. *The Prosecutor Law Review*, 3(3). <https://doi.org/10.64843/prolev.v3i3.78>
- Ivanova, L. V., Викторовна, И. Л., Arzhilovskiy, D. E., Евгеньевич, А. Д., Kalashnikov, N. A., & Анатольевич, К. Н. (2025). Defining 'robotics' for legal responsibility: A conceptual framework. *RUDN Journal of Law*, 29(2), 509–523. <https://doi.org/10.22363/2313-2337-2025-29-2-509-523>
- Khasanah, D. D., Iftitah, A., Kasioni, Abas, M., Sipayung, B., Hastarini, A., Arifuddin, Q., Dewi, S. R., Anita, A. A., Dewi, N., Jenar, S., Bhakti, I. S. G., Faried, F. S., Tarmizi, R., Ningtyas, M. A., Puspendari, R. Y., & Rohmah, A. N. (2023). *Hukum Perdata*. Sada Kurnia Pustaka.
- Petit, N. (2017). *Law and Regulation of Artificial Intelligence and Robots—Conceptual Framework and Normative Implications* (SSRN Scholarly Paper No. 2931339). Social Science Research Network. <https://doi.org/10.2139/ssrn.2931339>
- Santo, M. F. O. da, Sari, L., Kamilah, A., & Reumi, F. (2024). *Pengantar Hukum Perdata: Teori & Referensi Komprehensif Dasar-dasar Hukum Perdata di Indonesia*. PT. Sonpedia Publishing Indonesia.
- Schaerer, E., Kelley, R., & Nicolescu, M. (2009). Robots as animals: A framework for liability and responsibility in human-robot interactions. *RO-MAN 2009 - The 18th IEEE International Symposium on Robot and Human Interactive Communication*, 72–77. <https://doi.org/10.1109/ROMAN.2009.5326244>
- Sofni, A., & Napisah. (2025). Pembatasan Kekuasaan Pemerintah dalam Hukum Administrasi Negara: Perspektif Hukum Umum dan Hukum Islam. *Journal of Law and Legal System*, 1(1), 1–7. <https://doi.org/10.61994/jlls.v1i1.927>
- Sulistio, F., & Salsabilla, A. D. (2023). Pertanggungjawaban pada Tindak Pidana yang Dilakukan Agen Otonom Artificial Intelligence. *UNES Law Review*, 6(2), 5479–5490. <https://doi.org/10.31933/unesrev.v6i2.1209>

- Syahronny, M. R., & Dewayanto, T. (2024). PENERAPAN TEKNOLOGI ARTIFICIAL INTELLIGENCE DAN BLOCKCHAIN DALAM MENDETEKSI FRAUD PADA PROSES AUDIT: SYSTEMATIC LITERATURE REVIEW. *Diponegoro Journal of Accounting*, 13(3).
<https://ejournal3.undip.ac.id/index.php/accounting/article/view/46067>
- Votto, A. M., Valecha, R., Najafirad, P., & Rao, H. R. (2021). Artificial Intelligence in Tactical Human Resource Management: A Systematic Literature Review. *International Journal of Information Management Data Insights*, 1(2), 100047.
<https://doi.org/10.1016/j.jjime.2021.100047>
- Waelen, R. A. (2023). A critical approach to AI ethics. In *Handbook of critical studies of artificial intelligence* (pp. 391–401). Edward Elgar Publishing.
<https://www.elgaronline.com/edcollchap/book/9781803928562/book-part-9781803928562-42.xml>
- Zeng, J. (2020). Artificial intelligence and China's authoritarian governance. *International Affairs*, 96(6), 1441–1459. <https://doi.org/10.1093/ia/iaa172>