International Journal of Humanities, Social Sciences and Business (INJOSS) e-ISSN: 2962-6781
Vol. 5 No. 2 May 2026, page 269-277
https://injoqast.net/index.php/JOSSS

MEASURING IMPACT, DEFINING LIABILITY: A LITERATURE REVIEW ON THE LEGAL IMPLICATIONS OF ARTIFICIAL INTELLIGENCE IN THE JUDICIAL SYSTEM AND REGULATORY FRAMEWORK IN THE DIGITAL AGE

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

Abstract

This article presents a comprehensive literature review on the legal implications of artificial intelligence (AI) in the judicial system and regulatory development in the digital age, with a focus on measuring impacts and defining legal liabilities. The findings reveal that AI enhances the efficiency of predictive justice and RegTech, yet poses risks of algorithmic bias, the black box problem, legal liability gaps, and threats to democratic legitimacy. The study identifies research gaps in developing countries such as Indonesia, where there is a lack of normative and institutional analysis. Recommendations include an adaptive risk-based model akin to the EU AI Act, human-in-the-loop oversight, and national regulations grounded in the Pancasila ethical framework to balance innovation with substantive justice.

Keywords: artificial intelligence, judicial system, rulemaking, legal implications, algorithmic bias, AI accountability, digital regulation, rule of law

Introduction

The development of artificial intelligence (AI) technology over the past few decades has brought significant changes to various sectors, including the legal and judicial systems. This digital transformation is not only changing how the law is enforced but also how it is produced, interpreted, and implemented in modern society. AI is now used in various functions, ranging from legal document analysis to predicting court rulings, marking a paradigm shift in traditional legal practice (Zeng, 2020) .

The integration of AI into the judicial system presents opportunities to enhance efficiency and consistency in legal decision-making. Technologies such as machine learning and natural language processing enable the processing of legal data on a large scale—a task previously difficult for humans to accomplish. This contributes to the acceleration of judicial processes and the reduction of case backlogs, which have long been a classic problem in many countries (Yuliana & Anita, 2026) .

However, the use of AI in the legal system also raises various complex normative and ethical issues. One of the main concerns is the potential for algorithmic bias, which could reinforce existing injustices within the social system. Algorithms trained using historical data risk reproducing patterns of discrimination, thereby raising serious questions about substantive justice within AI-based judicial systems (Waelen, 2023). Furthermore, the often “black box” nature of AI poses challenges regarding transparency and accountability. In a legal context, decisions that cannot be rationally

explained risk violating the principle of due process of law. This becomes problematic when judges or law enforcement officials rely on systems they do not fully understand (Votto et al., 2021) .

This transformation has also sparked debate regarding the role of humans within the judicial system. Reliance on AI risks diminishing the human judgment dimension that has long been central to the judicial process. Yet, aspects of empathy, morality, and social context often cannot be reduced to algorithmic logic (Syahronny & Dewayanto, 2024) . On the other hand, the development of AI also has a significant impact on the legislative process. This technology is increasingly being used in policy analysis, regulatory impact simulations, and data-driven legal norm design. This phenomenon is known as regulatory technology (RegTech), which has the potential to improve the quality of legislation (Votto et al., 2021) .

Nevertheless, the use of AI in regulatory formation poses new challenges regarding democratic legitimacy. Legislative processes involving advanced technology risk reducing public participation and transparency if not properly regulated. This could undermine the principle of popular sovereignty in lawmaking (Sulistio & Salsabilla, 2023) . Another equally important issue concerns legal liability for actions involving AI. In this context, the question arises as to who should be held responsible when errors or harm result from the use of AI: the developer, the user, or the system itself. This ambiguity highlights a legal vacuum that needs to be addressed immediately (Shatila, 2025) .

Various countries and international organizations have begun formulating regulatory frameworks to govern the use of AI. The European Union, for example, has adopted a risk-based approach through the EU AI Act, which classifies AI systems based on the level of risk they pose. This approach has become one of the models frequently referenced in the global development of AI regulations (Act, 2024) .

In the context of developing countries, including Indonesia, the challenges faced are more complex. In addition to limitations in infrastructure and technological capacity, there is also a need to align regulations with local values and the national legal system. Therefore, a contextual and adaptive approach is required in regulating AI (Schiller et al., 2025) .

Previous studies on the legal implications of AI indicate that most research remains dominated by technical and ethical perspectives, while normative and institutional legal analysis remains relatively limited. This highlights a research gap that needs to be addressed, particularly in the context of integrating AI into national legal systems (Saragih et al., 2023) .

Based on this background, this article aims to further examine the legal impacts and implications of artificial intelligence within the judicial system and the development of regulations in the digital age. By identifying existing patterns, challenges, and opportunities, it is hoped that this research can provide conceptual and

practical contributions to the development of a legal framework responsive to technological advancements.

Research Methodology

This study employs a literature review approach with the aim of identifying, evaluating, and synthesizing various relevant scientific sources regarding the legal implications of artificial intelligence in the judicial system and regulatory development in the digital age. Data were obtained from national journals, international journals, books, and other documents. The selection process was conducted using inclusion and exclusion criteria, including topic relevance, journal quality, and theoretical and empirical contributions, and was then qualitatively analyzed using content analysis techniques to identify patterns, themes, and research gaps (Eliyah & Aslan, 2025) ; (Carrie, 2011) .

Results and Discussion

The Impact of AI Use in the Judicial System

The use of artificial intelligence (AI) in the judicial system has revolutionized the legal decision-making process through various applications such as decision support systems, predictive analytics, and legal research automation. This technology enables large-scale analysis of legal data that was previously impossible to conduct manually, thereby accelerating the identification of relevant precedents and decision patterns. The integration of AI into the judiciary marks a shift from traditional deliberative mechanisms toward algorithm-based systems that promise significant procedural efficiency (Saragih et al., 2023) .

One of the primary applications of AI is predictive justice, where algorithms predict case outcomes based on historical court decision data. Such systems can reduce case backlogs by helping judges prepare arguments and identify key issues more quickly. In Indonesia, digital transformation through e-Court and the Case Tracking Information System (SIPP) has laid the foundation for further AI integration (Roemmich et al., 2023) . The efficiency benefits of AI are also evident in the automation of administrative tasks such as legal document retrieval, contract analysis, and hearing scheduling. AI can read thousands of documents in a short time, identify legal patterns, and provide consistent recommendations, thereby reducing the workload of judges and court staff. This is particularly relevant in countries with high case volumes such as Indonesia (Respati, 2024).

Consistency in rulings is another advantage of AI, where algorithms generate more objective decisions based on historical data without being influenced by subjective factors such as a judge's fatigue or personal bias. However, this consistency must be distinguished from substantive justice, which considers the social and moral context of individual cases. Using AI as an advisory tool, rather than a decision-maker, is a crucial principle in maintaining this balance (Ravizki & Yudhantaka, 2022) .

Nevertheless, one of the primary negative impacts is the potential for algorithmic bias that reproduces systemic injustices from training data. Algorithms trained on historical data risk perpetuating racial, gender, or economic discrimination inherent in the conventional judicial system. The COMPAS case in the United States demonstrates how AI can systematically harm minority groups. The issue of transparency, or the "black box problem," poses a critical ethical challenge where AI decision-making processes cannot be logically explained to stakeholders. In the judicial system, the inability to understand the reasoning behind AI recommendations violates the principle of due process of law and the right to a fair trial (Arvitto & Astuti, 2026) . Therefore, the development of explainable AI (XAI) is a priority within the judicial system.

The dehumanization of the judicial process is also a serious concern, as replacing human judgment with algorithms reduces the elements of empathy and contextual consideration that are essential in law. The judiciary is not only about legal facts, but also moral values and restorative justice, which require human interaction. The "human-in-the-loop" principle is necessary to ensure that final decisions remain in the hands of judges (Wu et al., 2022) .

Predictive policing, another AI application in law enforcement, maps crime risk zones based on historical data for the allocation of police resources. While it improves efficiency, this approach has the potential to violate privacy and create a self-fulfilling prophecy where excessive policing actually triggers crime. Data privacy regulations are crucial to addressing these risks. In the Indonesian context, the Supreme Court has adopted progressive digital transformation, but AI integration requires a comprehensive ethical audit, including fairness audits, transparency audits, and security audits. The European Ethical Charter on AI in Judicial Systems can serve as a reference for ethical standards adaptable to the local context. The use of AI must strengthen judicial independence, not threaten it (Act, 2024) .

Implications for judicial independence arise when judges become overly reliant on AI recommendations, which could potentially reduce decision-making autonomy. AI systems developed by the private sector also raise conflicts of interest regarding proprietary data and algorithms. A national regulatory framework is necessary to ensure judicial supremacy over technology (Acemoglu & Restrepo, 2020) .

Previous studies, such as the Loomis ruling in Wisconsin, USA, affirm that AI may be used as a factor for consideration but must not serve as the primary basis for a ruling. This case sets a global precedent that AI is a supportive tool, not a replacement for judges, in line with the “human-in-command” doctrine. This lesson is relevant for Indonesia in adopting similar technologies (Freeman, 2016) .

In China, an AI-based social credit scoring system has been integrated into the judicial process, where individual scores influence legal rulings. Although efficient, this system has been criticized for sacrificing individual privacy and freedom in the name

of social control. This contrast highlights the trade-off between efficiency and human rights in the application of judicial AI (Zeng, 2020) .

The economic impacts of AI in the judiciary include cost savings in court operations through automation, but also require significant upfront investment in infrastructure and judge training. In developing countries, the digital divide may undermine access to justice for marginalized communities. Inclusive policies are needed to ensure the benefits of AI are distributed equitably (Alekseenko, 2023) .

Overall, the impact of AI on the judicial system is ambivalent: it offers efficiency and consistency, but has the potential to threaten substantive justice if not properly regulated. Risk-based approaches such as the EU AI Act, which classifies AI systems based on their level of risk, can be adapted to the Indonesian context to balance innovation and accountability.

Legal Implications of AI in Regulatory Development in the Digital Age

The use of artificial intelligence (AI) in the drafting of legislation marks a new era of digital regulation, in which technology supports the entire policy cycle—from problem identification to impact assessment. AI facilitates the analysis of massive amounts of data to identify regulatory needs, predict policy consequences, and optimize the legislative process. In Indonesia, the constitution guarantees the use of technology in lawmaking, opening the door for the strategic integration of AI (Alekseenko, 2023) .

AI-based Regulatory Technology (RegTech) has revolutionized public policy-making through the automation of administrative tasks, predictive analysis, and data-driven decision-making. Governments can simulate the impact of regulations before implementation, thereby enhancing the effectiveness and efficiency of policies. Indonesia's National Artificial Intelligence Strategy 2020–2045 emphasizes ethics, talent, and infrastructure to support this transformation (Cath et al., 2018) .

AI contributes to classifying public participation through real-time sentiment analysis of public input, cross-legal regulation synchronization, and the formulation of evidence-based recommendations. Processes that previously took months can be significantly accelerated. A non-doctrinal approach demonstrates that AI makes legislation faster and more effective. However, the primary legal implication is accountability for AI's autonomous decisions in the regulatory process. When AI generates draft legislation or policy recommendations, the question arises: who is responsible—legislators, AI developers, or executive agencies? A human oversight model becomes essential, as in the EU AI Act (Cath et al., 2018) .

The legal vacuum regarding autonomous AI poses a serious threat in Indonesia, where the ITE Law does not yet cover autonomous algorithms that generate legal content. Conventional approaches fail to regulate AI as a potential legal subject, requiring new regulations that recognize its quasi-legal entity status. This can be addressed through AI risk classification (De Stefano, 2018) .

The democratic legitimacy of the legislative process is threatened when AI replaces public participation with aggregate data analysis. AI-based e-consultation platforms do facilitate access, but risk reducing authentic deliberation and the representation of marginalized groups. A balance between technological efficiency and the principles of representative democracy is necessary (Fidelangeli & Galli, 2021)

.A risk-based approach to AI regulation, such as the EU Artificial Intelligence Act, classifies systems based on risk levels: minimal, high-risk, and prohibited. Indonesia could adopt this model to regulate AI in legislation, with penalties ranging from administrative sanctions to a percentage of global revenue for violations. Oversight through specialized bodies like the European AI Office serves as a model (Ghedabna et al., 2024) .

Legal cultural transformation in the digital age requires adapting traditional values to demands for algorithmic transparency and AI audits. The use of AI in legislative drafting shifts the paradigm from normative to empirical-data-driven, but risks creating systemic bias if training data is not representative. Normative legal methods emphasize the need for specific regulations (Hossain et al., 2025) .

In the Indonesian context, the idea of regulating AI as a legal entity is beginning to be discussed to address the challenge of liability for regulatory decisions. The legal status of AI as an electronic person can provide legal certainty, although it is philosophically controversial. Empirical research supports this evolution in line with technological developments (Huang et al., 2011) .

The use of AI in data-driven legislative drafting processes enhances accuracy by detecting inconsistencies between regulations and anticipating socio-economic impacts. However, data privacy ethics remain a critical issue, particularly when AI analyzes public input. European GDPR standards can serve as a benchmark for protection. Harmonizing national AI regulations with international standards is essential for attracting global investment and collaboration. Indonesia lags behind the EU or Singapore, where the AI Act and Model AI Governance Framework have been implemented. A national strategy must include mandatory algorithm audits for high-risk systems under the " legislation .

Implications for regulatory sovereignty arise when AI is developed by foreign companies, potentially influencing the national policy agenda through data dependency. Data sovereignty and localization policies are necessary to protect the public interest. For example, the development of local AI through national research. Ethical impacts include the potential for deepfakes and manipulation of public opinion that influence legislative consultation processes. Regulations must include verification of the authenticity of AI-generated inputs to safeguard democratic integrity. A multi-stakeholder approach involves academics, government, and civil society (Indonesia, 2020) .

Overall, the legal implications of AI in rulemaking demand an adaptive framework that balances innovation with accountability, transparency, and democratic

participation. Indonesia needs specific AI legislation to fill legal gaps, adopting global best practices while adapting to the local context to ensure inclusive and fair digital-era regulation.

Conclusion

Artificial intelligence brings a dual transformation to the judicial system and rule-making: extraordinary operational efficiency alongside risks of algorithmic bias, lack of transparency, and the dehumanization of legal processes that threaten the foundations of substantive justice. In the judicial system, AI promises consistency in rulings through predictive justice, yet the "black box problem" and potential for systemic discrimination demand the development of explainable AI and periodic ethical audits. Meanwhile, in the legislative sphere, AI-based RegTech accelerates policy cycles but creates legal vacuums regarding autonomous liability and democratic legitimacy, requiring adaptive risk-based models.

Key findings underscore the need for a balance between human supremacy (human-in-the-loop) and the potential of technology in upholding the rule of law in the digital age. The EU AI Act's approach, which classifies systems based on risk levels, provides a global blueprint, while the Indonesian context demands contextual regulation that integrates Pancasila values with international standards. Research gaps lie in the scarcity of normative and institutional analysis in developing countries, particularly regarding the harmonization of AI with civil law systems.

Ultimately, measuring the impact of AI means formulating adaptive legal responsibilities—not rejecting innovation, but controlling it in the interest of inclusive justice. Conceptual recommendations include the establishment of a national AI oversight body, training for digital judges, and strengthening public participation grounded in data ethics. The contribution of this article lies in its comprehensive literature review, which serves as the foundation for developing a responsive, accountable, and people-centered AI regulatory framework in Indonesia.

References

Acemoglu, D., & Restrepo, P. (2020). The wrong kind of AI? Artificial intelligence and the future of labour demand. *Cambridge Journal of Regions, Economy and Society*, *13*(1), 25–35.

Act, E. A. I. (2024). The eu artificial intelligence act. *European Union*. https://www.wsgr.com/a/web/qrkz1SnNzWw6nk7B3oAyDa/10-things-you-should-know-about-the-eu-artificial-intelligence-act_v2.pdf

Alekseenko, A. (2023). Rights of investors in the context of algorithmic Artificial Intelligence technologies and automatization. *Brazilian Journal of Law, Technology and Innovation*, *1*(2), 42–62. https://doi.org/10.59224/bjlti.v1i2.42-62

Arvitto, R., & Astuti, P. (2026). PREDICTIVE JUSTICE SEBAGAI INOVASI SISTEM PERADILAN PIDANA: STUDI KOMPARATIF INDONESIA DAN BELANDA. *Indonesian Journal of Contemporary Law*, *3*(02), 1–20.

Carrie, W. (2011). Research Methods. *Journal of Business & Economics Research (JBER)*, *5*(3). https://doi.org/10.19030/jber.v5i3.2532

Cath, C., Wachter, S., Mittelstadt, B., Taddeo, M., & Floridi, L. (2018). Artificial Intelligence and the 'Good Society': The US, EU, and UK approach. *Science and Engineering Ethics*, *24*(2), 505–528. https://doi.org/10.1007/s11948-017-9901-7

De Stefano, V. (2018). *'Negotiating the Algorithm': Automation, Artificial Intelligence and Labour Protection* (SSRN Scholarly Paper No. 3178233). Social Science Research Network. https://doi.org/10.2139/ssrn.3178233

Eliyah, E., & Aslan, A. (2025). STAKE'S EVALUATION MODEL: METODE PENELITIAN. *Prosiding Seminar Nasional Indonesia*, *3*(2), Article 2.

Fidelangeli, A., & Galli, F. (2021). *Artificial Intelligence and Tax Law: Perspectives and Challenges*. https://cris.unibo.it/handle/11585/880745

Freeman, K. (2016). Algorithmic injustice: How the Wisconsin Supreme Court failed to protect due process rights in State v. Loomis. *North Carolina Journal of Law & Technology*, *18*(5), 75.

Ghedabna, L., Ghedabna, R., Imtiaz, Q., Faheem, M. A., Alkhayyat, A., & Hosen, M. S. (2024). Artificial intelligence in human resource management: Revolutionizing recruitment, performance, and employee development. *Nanotechnology Perceptions*, *20*(S10), 52–68.

Hossain, S., Fernando, M., & Akter, S. (2025). Digital Leadership: Towards a Dynamic Managerial Capability Perspective of Artificial Intelligence-Driven Leader Capabilities. *Journal of Leadership & Organizational Studies*, *32*(2), 189–208. https://doi.org/10.1177/15480518251319624

Huang, L., Joseph, A. D., Nelson, B., Rubinstein, B. I. P., & Tygar, J. D. (2011). Adversarial machine learning. *Proceedings of the 4th ACM Workshop on Security and Artificial Intelligence, AISec '11*, 43–58. https://doi.org/10.1145/2046684.2046692

Indonesia, K. A. (2020). *National Strategy for Artificial Intelligence 2020-2045 (2020)(Indonesian)*. https://openresearch-repository.anu.edu.au/bitstreams/a954ab22-5b81-45de-80ed-823deffe3820/download

Ravizki, E. N., & Yudhantaka, L. (2022). Artificial Intelligence Sebagai Subjek Hukum: Tinjauan Konseptual dan Tantangan Pengaturan di Indonesia. *Notaire*, *5*(3). https://e-journal.unair.ac.id/NTR/article/download/39063/22918

Respati, A. A. (2024). Reformulasi UU ITE terhadap Artificial Intelligence Dibandingkan dengan Uni Eropa dan China AI Act Regulation. *JURNAL USM LAW REVIEW*, *7*(3), 1737–1758. https://doi.org/10.26623/julr.v7i3.10578

Roemmich, K., Rosenberg, T., Fan, S., & Andalibi, N. (2023). Values in Emotion Artificial Intelligence Hiring Services: Technosolutions to Organizational Problems. *Proc. ACM Hum.-Comput. Interact.*, *7*(CSCW1), 109:1-109:28. https://doi.org/10.1145/3579543

Saragih, A. H., Reyhani, Q., Setyowati, M. S., & Hendrawan, A. (2023). The potential of an artificial intelligence (AI) application for the tax administration system's modernization: The case of Indonesia. *Artificial Intelligence and Law*, *31*(3), 491–514. https://doi.org/10.1007/s10506-022-09321-y

Schiller, J., Stiller, S., & Ryo, M. (2025). Artificial intelligence in environmental and Earth system sciences: Explainability and trustworthiness. *Artificial Intelligence Review*, *58*(10), 316. https://doi.org/10.1007/s10462-025-11165-2

Shatila, K. (2025). Artificial intelligence and organizational resilience: The mediating role of agility, innovation, and digital leadership. *Strategy & Leadership*, 1–25. https://doi.org/10.1108/SL-08-2025-0275

Sulistio, F., & Salsabilla, A. D. (2023). Pertanggungjawaban pada Tindak Pidana yang Dilakukan Agen Otonom Artificial Intelegence. *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.jjimei.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

Wu, X., Xiao, L., Sun, Y., Zhang, J., Ma, T., & He, L. (2022). A survey of human-in-the-loop for machine learning. *Future Generation Computer Systems*, *135*, 364–381. https://doi.org/10.1016/j.future.2022.05.014

Yuliana, S., & Anita, D. (2026). Pelayanan Publik Digital sebagai Instrumen Peningkatan Kepercayaan Masyarakat terhadap Pemerintah. *RIGGS: Journal of Artificial Intelligence and Digital Business*, *4*(4), 13973–13980. https://doi.org/10.31004/riggs.v4i4.5407

Zeng, J. (2020). Artificial intelligence and China's authoritarian governance. *International Affairs*, *96*(6), 1441–1459. https://doi.org/10.1093/ia/iiaa172