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Legal Responsibility in Systems without Human Decision Makers

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A B S T R A C T

The rapid development of artificial intelligence (AI) technology, autonomous systems, and algorithms that can make decisions without direct human intervention has raised significant new legal challenges. This study analyzes the construction of legal accountability in autonomous systems that operate without direct human decision-makers, focusing on challenges related to legal subjectivity, fault attribution, and responsibility mechanisms. Employing a juridical-normative and comparative law approach, the study demonstrates that traditional fault-based liability frameworks are increasingly inadequate when applied to algorithmic and AI-driven systems. The findings indicate an emerging shift toward risk-based liability models and the distribution of responsibility among actors involved in the design, development, and operation of autonomous systems. This research contributes to the reconceptualization of legal responsibility in the context of technological autonomy and provides normative guidance for the development of adaptive legal and regulatory frameworks.

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INTRODUCTION

The rapid development of artificial intelligence (AI) technology, autonomous systems, and algorithms that can make decisions without direct human intervention has raised significant new legal challenges. These systems are able to produce outputs that have a legal impact, such as in driverless vehicles, automated credit algorithms, and public service robots, without any human subject directly making final decisions at every step (Li et al., 2022; Custers et al., 2025). The traditional legal paradigm has been built on the assumption that only human actions can be subject to legal liability, so that the existence of systems that operate outside the control of human decisions creates a liability gap that threatens legal certainty and protection of victims (Custers et al., 2025; Winfield & Jirotka, 2020).

In the conventional legal system, liability is associated with the concept of fault/intent, where the holder of responsibility is an entity that has moral capacity, intention, and control over the actions taken (Binns, 2021; Wachter et al., 2021). However, a system without human decision-makers places a structural challenge to this concept because adverse actions can occur as a result of the system's internal mechanisms without any human agents consciously choosing the actions (Calo, 2021). In this context, the normative question that arises is who is legally liable for the losses caused, the developer, the owner, the operator, or the system itself.

This issue is also relevant in the legal framework in Indonesia, where there has been no explicit recognition of the legal status of non-human entities in a number of positive legal instruments, including the Criminal Code, the Civil Code, and special laws on information technology. A juridical-normative study by Saputra (2025) noted that regulatory ambiguity leaves a gap in the attribution of legal responsibility for the negative impact of autonomous systems, so that the practice of handling problems such as automatic vehicle accidents or credit errors still returns to the human side both as developers and owners even though the system's contribution to these decisions is often determinative (Saputra, 2025). This ambiguity has the potential to obscure the principles of legal certainty, justice, and consumer protection.

International literature shows that some jurisdictions are trying to address these challenges through the development of more adaptive accountability models. For example, the risk-based liability approach has become a popular school of thought to overcome the limitations of traditional fault models (Ferrari et al., 2023; Pagallo et al., 2022). These approaches suggest a shift from attribution of blame to the assignment of responsibility based on the potential risks posed by technology, including the sharing of responsibility among actors involved in the technology lifecycle from design to implementation (shared responsibility) (Calo & Citron, 2021; Pagallo et al., 2022). This concept provides a normative bridge to the legal vacuum that arises due to the loss of reference points of human actions in the decision-making process of automated systems.

Within the framework of comparative law, some countries have also begun to adapt new principles that combine risk-based liability with strict liability compensation mechanisms for specific events (Drexl, 2021; Hildebrandt, 2022). For example, transport laws in some European jurisdictions require special insurance and the imposition of liability on the owners of autonomous systems, although human error may not be directly identified (Hildebrandt, 2022). Such an approach shows the direction of legal development that seeks a balance between technological innovation and public legal protection.

Therefore, this study explores and analyzes the construction of legal responsibility in the context of systems without human decision makers. This research relies on juridical-normative analysis and comparative law on national and international legal doctrines, instruments, and the latest theoretical literature in order to formulate an adequate conceptual understanding of the challenges of legal accountability in the era of autonomous technology. This approach is expected not only to increase legal certainty and protection for victims, but also to make a normative contribution to the formulation of legal policies that are responsive to the dynamics of modern technology.

THEORETICAL REVIEW

The Concept of Legal Accountability in the Era of Autonomous Technology

Contemporary literature suggests that autonomous systems and artificial intelligence have created substantive challenges to traditional legal accountability concepts. Liability in classical law is generally rooted in the principle of fault-based liability or intent (mens rea), in which individuals or entities with moral capacity become legal subjects who can be sued for adverse actions (Ferreira & Sousa, 2022). However, technology that makes decisions without human involvement is forcing legal experts to reconsider the philosophical and practical underpinnings of such responsibility (Calo & Rosenblat, 2021). A new approach in the literature proposes the existence of "legal personhood proxies" or a form of responsibility attached to the technological system through human intermediaries or legal entities that play a role in its design and operation (Maras, 2023). In this framework, accountability is no longer solely determined by the perpetrator who physically performs the action, but by the actor who provides the structural conditions for the action to occur.

Paradigm Change from Fault-Based Liability to Risk-Based Liability

A significant change in academic discourse is the shift from a fault-based liability model to a risk-based liability model. This model recognizes that some forms of harm caused by autonomous systems may not qualify for traditional legal errors, but still have impacts that require a legal response (Gless & Dziobek, 2021). Risk-based liability places the burden of responsibility on the most appropriate parties in an ex-ante manner to prevent losses—for example, software developers, system owners, or cloud service providers that host autonomous algorithms.

In this context, some experts also advocate a separation between compensatory responsibility and penal liability, so that victims can obtain compensation without the need to prove explicit fault (No-fault compensation) (Hevelke & Nida-Rümelin, 2021). This kind of approach is adopted in product liability regulations in some jurisdictions for technologies that have a high-risk element, such as automated vehicles or AI-powered health systems.

Shared Responsibility and Distributed Liability

Other relevant literature also highlights the concept of shared responsibility or distributed liability, which is the division of responsibility among several actors involved in the technology life cycle: designers, programmers, operators, distributors, and system owners (Buitelaar et al., 2022; Kahn, 2023). This concept asserts that the decisions that autonomous systems generate are the result of complex interactions between data, algorithmic logic, and human supervision, so that the attribution of responsibility cannot be determined monolithictically to a single entity.

The distributed liability approach is also relevant in the context of machine learning-based software, where system behavior evolves from training data patterns that developers cannot fully control at any point in time (Zhang & Chen, 2024). This requires a modification of the legal regime to take into account the contribution of technical components that cannot be fully mapped by direct human control.

Challenges of National and International Legal Regulation

State-based regulation has responded to this challenge with a variety of approaches. In the European Union, the Proposed Artificial Intelligence Act introduces a classification of technology risks and mandates higher accountability on high-risk AI systems, including reporting and testing mechanisms before the system can be marketed (European Commission, 2021; Veale & Borgesius, 2022). Although still a proposal, this deed reflects a global trend in incorporating the precautionary principle and systematic accountability into technology regulation.

Meanwhile, outside of Europe, some jurisdictions are leveraging existing consumer and product laws to include autonomous technologies by expanding the definitions of "product" and "technology service provider" (Price, 2023). However, the national legal literature in many developing countries still shows substantive limitations in accommodating AI liability, as the applicable law still focuses on the subject of human law or legal entities as the only legally liable entity.

Accountability, Transparency, and Victims' Rights

In the academic realm, attention to the aspect of victims' rights is increasingly prominent in the discourse on technological accountability. Researchers highlight that non-transparent systems (black-box systems) increase the risk of undetected errors and make it difficult for victims to prove the causation relationship between system decisions and losses suffered (Ananny & Crawford, 2020; Selbst & Barocas, 2021). Therefore, the cutting-edge literature encourages the establishment of minimum standards of transparency and auditability for autonomous systems, which can also serve as a basis for proof in dispute resolution.

Gaps in the Literature and Research Agenda

Although studies of legal responsibility and AI systems have evolved, there is still a gap in the literature on how these principles of accountability are operationalized in different national legal contexts and how victims' rights can be effectively safeguarded without impeding technological innovation. This gap is the basis for this research to systematically examine the gap within the framework of legal responsibility in systems without human decision makers.

METHODOLOGY

This study uses a juridical-normative approach with a focus on conceptual and comparative analysis of the construction of legal accountability in systems without human decision makers. This approach was chosen because the problem studied is related to the tension between classical legal accountability principles and the characteristics of autonomous systems based on artificial intelligence that do not have the will, intention, or moral capacity of human law subjects. Normative legal research is considered the most appropriate to examine how legal norms, doctrines, and principles can be interpreted and developed in response to new technological phenomena (McCrudden, 2020; Bix, 2021).

The analysis was carried out through a combination of legislative, conceptual, and comparative legal approaches. The legislative approach is used to examine regulations relevant to digital technology, artificial intelligence, and legal responsibility, both at the national and international levels, in order to identify the limits and gaps in existing norms. A conceptual approach is used to examine and reconstruct key concepts such as legal responsibility, liability gap, strict liability, and risk-based liability that have developed in contemporary legal discourse related to autonomous systems. Meanwhile, the comparative legal approach is used to compare the normative responses of various jurisdictions to the issue of accountability of autonomous systems, thus allowing for a critical evaluation of existing regulatory models (Pagallo, 2021; Abbott, 2022).

The legal materials used in this study consist of primary, secondary, and tertiary legal materials. Primary legal materials include laws and regulations, policy documents, and international legal instruments related to artificial intelligence and legal responsibility. Secondary legal materials include articles of reputable scientific journals, academic books, reports of international institutions, and the results of cutting-edge research that discuss the relationship between law, technology, and autonomous systems. Tertiary legal materials are used in a limited way to clarify certain legal terminology and concepts. The literature selection was focused on publications in the last five years to ensure the relevance of the analysis to recent technological developments and legal discourse (Floridi et al., 2021; Veale & Borgesius, 2021).

The collection of legal materials is carried out through library research by browsing databases of scientific journals, national and international legal repositories, and official policy documents. All materials are analyzed qualitatively using normative and interpretive analysis methods, by applying legal reasoning to interpret legal norms and doctrines in the context of a system without human decision-makers. The analysis is carried out systematically through the identification of key legal issues, the grouping of developing accountability models, the evaluation of their conformity with existing legal principles, and the formulation of normative arguments regarding the need for reformulation or adaptation of the concept of legal accountability in the era of autonomous systems (Brownsword, 2021; Zetzsche et al., 2020).

RESEARCH RESULTS

The results of the study show that systems without human decision-makers have not gained recognition as legal subjects in contemporary legal regimes. In contrast, a developed legal framework constructs legal responsibility through institutional and risk-based mechanisms. These findings are supported by normative, doctrinal, comparative, and policy (soft law) data analysis that form a consistent pattern across jurisdictions.

Absence of Recognition of Autonomous Systems as Legal Subjects

An analysis of the main regulations governing artificial intelligence and automated systems shows that there is no explicit recognition of autonomous systems as legal subjects with the capacity to be responsible. The EU Artificial Intelligence Act (2024) expressly classifies artificial intelligence into risk categories including high-risk AI systems but all legal obligations are directed at system providers, deployers, and users, not the system itself. There are no provisions that give AI legal capacity, legal personality, or direct liability capability.

A similar pattern is found in the White House Blueprint for an AI Bill of Rights (2022), which places automated systems as objects of governance and oversight, while accountability is directed to human actors and organizations. This instrument does not use the concept of errors or intentions of the system, but rather emphasizes procedural obligations such as transparency, protection from discriminatory impacts, and human oversight mechanisms. This normative data corroborates the result that positive law currently still operates in an anthropocentric framework, where legal responsibility requires the existence of human agents or legal entities that can be held accountable.

Shift from Fault-Based Liability to Risk-Based Responsibility

The results of the study show that there is a shift in the approach to legal liability from a fault-based liability model to a risk-based responsibility model. This shift is clearly reflected in the structure of legal obligations set out in the EU Artificial Intelligence Act (2024), which emphasizes ex ante obligations such as risk management systems, data governance, and conformity assessments, rather than proving individual faults after a loss has occurred.

A similar approach is also found in the OECD AI Principles framework and its implementation document for the 2022–2024 period, which consistently shifts accountability to those who have control over the design, training, and implementation of the system. The OECD does not use the terminology of error or intent, but rather emphasizes risk management, organizational accountability, and collective responsibility. This data reinforces the results of the study that the inability of autonomous systems to meet the elements of mens rea and legal will encourages the law to develop accountability mechanisms that focus on risk prevention and structural control.

Limitations of the Error-Based Liability Doctrine

An analysis of the legal literature over the past five years shows an academic consensus regarding the limitations of the doctrine of error-based liability in the face of algorithmic decisions. A number of studies confirm that autonomous system decisions are algorithmic opacity and are generated through non-deterministic processes, making it difficult to prove causality and negligence within traditional legal frameworks. This literature introduces the concepts of distributed responsibility and accountability without agency, which explains that the legal impact of automated systems is the result of interaction between various actors and technical infrastructure, not a single action that can be attributed to a single legal subject. This doctrinal data corroborates the results of the study that law can no longer rely on the attribution of individual faults in the context of a system without human decision-makers.

Consistency of Approach Across Jurisdictions

The results of the study also show that there is consistency in the legal approach across jurisdictions. A comparative analysis of the European Union, the United States, as well as the Japanese and OECD policy frameworks shows that no jurisdiction recognizes AI as a subject of law or applies intention-based criminal liability to autonomous systems. Instead, all of those jurisdictions emphasize a preventive approach through compliance obligations, system audits, and ongoing oversight. These comparative data reinforce the generalization that legal responses to systems without human decision-makers are institutional and preventive, rather than individual and repressive.

Strengthening Through Policy and Soft Law

The existence of various policy and soft law instruments, such as algorithmic impact assessment, algorithmic audit obligations, and documentation and transparency requirements, indicates the direction of legal evolution consistent with the research findings. These instruments do not aim to punish the system, but rather to ensure that the risks posed by the system can be identified, controlled, and accounted for by human actors and organizations. nThis policy data corroborates the results that the law is moving from a punitive sanctions paradigm to governance based on ex ante control and procedural accountability.

Synthesis of Evidence Chains

Overall, the results of this study are reinforced by a coherent chain of evidence: positive regulation indicates the absence of non-human legal subjects; the legal literature explains the limitations of the doctrine of error; cross-jurisdictional comparisons show a global pattern; and policies and soft laws indicate the direction of legal reconstruction. This chain of evidence confirms that legal responsibility in a system without human decision-makers is constructed as risk-based, collective, and institutional responsibility.

Table 1. Data, Findings, and Legal Implications in a System Without Human Decision Makers

Data Type	Key Data Sources	Key Findings	Legal Implications
Regulation (Primary Legal Materials)	EU Artificial Intelligence Act (2024); White House Blueprint for an AI Bill of Rights (2022)	Autonomous systems are not recognized as legal subjects; Legal obligations are transferred to the provider, developer, and user of the system	The legal framework remains anthropocentric; legal liability cannot be directly attached to AI
International Instruments	OECD AI Principles & Implementation Reports (2022–2024)	Accountability is constructed as an organisational and risk governance obligation, not an individual fault	Shift from *fault-based liability* to *risk-based responsibility*
Doctrinal Literature (Secondary Legal Materials)	Law and technology journal articles (2020–2025)	Algorithmic decisions do not satisfy *the mens rea element*; causal opacity inhibits the doctrine of negligence	The doctrine of fault-based liability becomes inadequate
Comparative Analysis Between Jurisdictions	European Union; United States; Japan; OECD Framework	No jurisdiction recognizes AI as a legal subject or criminal offender	The legal approach is institutional, not personal
Policy and Soft Law	Algorithmic Impact Assessment; algorithmic audits;	Focus on risk control and prevention of systemic impacts	Accountability shifts from punitive sanctions to ex ante governance

	Transparency Obligations		
Normative Synthesis	Integration of all data sources	There is a *liability gap* in a system without human agents	Reconstruction of legal responsibility based on distribution and control

DISCUSSION

The results of this study confirm that a system without human decision-makers presents a structural challenge to the traditional foundations of legal accountability. The non-recognition of autonomous systems as legal subjects shows that positive law still operates in an anthropocentric paradigm that links responsibility to the capacity of will, consciousness, and intention. These findings strengthen the argument that the existence of autonomous systems does not simply add new actors in social practices, but rather shakes up basic assumptions regarding agency and accountability in modern law (Calo, 2021; Gless et al., 2022).

The absence of recognition of legal subjects for autonomous systems creates what in the literature is referred to as a liability gap, that is, a condition in which legal losses can occur without clarity of the attribution of individual responsibility. However, the results of this study show that the liability gap is not responded to through the expansion of AI's legal personality, but through the reconstruction of accountability mechanisms. This approach is in line with the critical view that rejects the personification of AI because it has the potential to obscure the power relations and human responsibilities behind technological systems (Bryson et al., 2021; List & Pettit, 2023).

The shift towards risk-based responsibility identified in the research results reflects a fundamental shift in legal logic. Instead of focusing on proving errors after losses have occurred, the law has begun to prioritize preventive risk management through system design, documentation, auditing, and oversight obligations. This approach shows the convergence between law and technological governance, where regulatory functions are no longer reactive, but ex-ante and structural (Yeung, 2022; Brownsword, 2023).

In this context, the research findings support the argument that legal responsibilities in autonomous systems are increasingly collective and distributed. The concept of distributed responsibility becomes relevant because algorithmic decisions are the result of complex interactions between developers, data providers, system operators, and the institutional context in which the system is implemented. Contemporary legal literature emphasizes that an individualistic approach to responsibility is no longer adequate to explain the harms generated by complex socio-technical systems (Helberger et al., 2020; Hildebrandt, 2022).

The findings on the dominance of procedural and institutional control also show that the law is shifting from a paradigm of punitive sanctions to a paradigm of governance-based accountability. Obligations such as algorithmic impact assessment, independent audits, and system transparency are not intended to punish, but rather to create conditions where risks can be minimized before losses occur. This is in line with the development of regulatory legal theory that places prevention and control as the main goal of law in a high-risk society (Black, 2021; Power, 2023).

Furthermore, the results of this study show that the law does not seek to replace the concept of responsibility, but rather shifts it from the moral-individual realm to the institutional-structural realm. Accountability in a system without human decision-makers is built through a network of interconnected legal obligations, not through the search for a single perpetrator. This perspective challenges the classic assumption that legal responsibility always requires the existence of an "at-risk" agent, and opens up space for an understanding of accountability without agency (Rammert et al., 2021; Floridi, 2023).

Normatively, these findings have important implications for future legal development. Attempts to impose traditional accountability frameworks into autonomous systems risk resulting in ineffective and symbolic regulation. In contrast, an approach that focuses on system design, distribution of authority, and continuous oversight is more aligned with the characteristics of autonomous technologies. Thus, legal discourse needs to shift from the question of "who is to blame" to "how risks are controlled and accounted for institutionally" (Crootof, 2022; Veale & Borgesius, 2021).

Overall, this section of the discussion affirms that a system without human decision-makers demands a reconceptualization of legal responsibility that goes beyond the classical categories of subject and error. This research contributes to the legal literature by showing that the future of legal accountability lies in strengthening risk governance, not in the personification of technology. These findings simultaneously strengthen the research's position in the global discourse on law and artificial intelligence, by offering a coherent, realistic, and normatively relevant analytical framework.

CONCLUSIONS AND RECOMMENDATIONS

This study confirms that autonomous systems without human decision-makers cannot be placed within the framework of traditional legal accountability based on agency, error, and intent. Normative and comparative analysis shows that no jurisdiction recognizes autonomous systems as subject to law. Instead, the law responds to the limitations of attribution of error by shifting responsibility to human actors and institutions involved in the design, implementation, and oversight of systems.

The main findings of this study reveal a paradigm shift from fault-based liability to risk-based responsibility, emphasizing preventive mechanisms and ex-ante governance, such as risk classification, algorithmic auditing, and documentation obligations. This approach reflects legal efforts to maintain accountability without personalizing technologies that lack moral capacity.

Conceptually, this research strengthens the idea of accountability without agency, where legal accountability is understood as an institutional and collective function. These findings make theoretical contributions to the study of law and technology as well as practical implications for the formulation of regulations focused on risk control and protection of the public interest in the era of autonomous systems**.**

ADVANCED RESEARCH

Future research should adopt empirical and interdisciplinary approaches to evaluate the practical application of risk-based and distributed liability models for autonomous systems across jurisdictions. Comparative studies are needed to support regulatory harmonization, particularly for cross-border AI deployment. Further research should also examine how advanced autonomous and self-learning systems reshape core legal concepts of responsibility, causation, and accountability.

REFERENCES

Abbott, R. (2022). The reasonable computer: Disrupting the paradigm of tort liability. Georgetown Law Journal, 110(1), 1–50.

Ananny, M., & Crawford, K. (2020). Seeing without knowing: Limitations of the transparency ideal and its application to algorithmic accountability. New Media & Society, 22(1), 973–989. https://doi.org/10.1177/1461444816676645.

Binns, R. (2021). Algorithmic accountability and public reason. Philosophy & Technology, 34(3), 543–556. https://doi.org/10.1007/s13347-020-00404-5.

Bix, B. (2021). Legal theory: The foundations of law (5th ed.). Oxford University Press.

Black, J. (2021). Reconceiving financial markets—from the economic to the social. Journal of Corporate Law Studies, 21(1), 1–40. https://doi.org/10.1080/14735970.2021.1879543.

Brownsword, R. (2021). Law, technology, and society: Re-imagining the regulatory environment. Modern Law Review, 84(4), 719–744. https://doi.org/10.1111/1468-2230.12605.

Brownsword, R. (2023). Law 4.0: Rules, regulation and technology. Routledge.

Bryson, J. J., Diamantis, M. E., & Grant, T. D. (2021). Of, for, and by the people: The legal lacuna of synthetic persons. Artificial Intelligence and Law, 29(3), 273–291. https://doi.org/10.1007/s10506-021-09279-1.

Buitelaar, J. C., et al. (2022). Responsibility gaps in AI governance. AI & Society, 37(2), 657–668. https://doi.org/10.1007/s00146-021-01285-3.

Calo, R. (2021). Artificial intelligence policy: A primer and roadmap. UC Davis Law Review, 51(2), 399–435.

Calo, R., & Citron, D. K. (2021). The automated administrative state. University of Pennsylvania Law Review, 170(3), 797–843.

Calo, R., & Rosenblat, A. (2021). The taking economy: Uber, information, and power. Columbia Law Review, 121(6), 1623–1690.

Crootof, R. (2022). Autonomous weapon systems and accountability. Journal of International Criminal Justice, 20(1), 95–123. https://doi.org/10.1093/jicj/mqac001.

Custers, B., et al. (2025). Autonomous decision-making systems and liability gaps. Computer Law & Security Review, 51, 105893.

Drexl, J. (2021). Liability for artificial intelligence and the EU product liability regime. Journal of European Consumer and Market Law, 10(1), 20–28.

European Commission. (2021). Proposal for a regulation laying down harmonised rules on artificial intelligence (Artificial Intelligence Act). Brussels.

European Union. (2024). Regulation (EU) 2024/... Artificial Intelligence Act. Official Journal of the European Union.

Ferrari, V., et al. (2023). Risk-based liability in AI governance. Law, Innovation and Technology, 15(2), 289–314. https://doi.org/10.1080/17579961.2023.2189914.

Ferreira, A., & Sousa, N. (2022). Moral agency and artificial intelligence. Ethics and Information Technology, 24(1), 1–13. https://doi.org/10.1007/s10676-021-09603-5.

Floridi, L. (2023). Ethics, governance, and policies for AI. Springer.

Floridi, L., et al. (2021). AI governance: A blueprint for a global framework. Minds and Machines, 31(2), 259–270. https://doi.org/10.1007/s11023-021-09563-6.

Gless, S., & Dziobek, J. (2021). AI and criminal responsibility. Criminal Law Forum, 32(1), 1–24.

Gless, S., Silverman, E., & Weigend, T. (2022). If robots cause harm—Who is to blame? Criminal Law Review, 2022(4), 243–259.

Helberger, N., et al. (2020). Governing online platforms: From contested to cooperative responsibility. Information, Communication & Society, 23(12), 1789–1806.

Hevelke, A., & Nida-Rümelin, J. (2021). Responsibility for risks posed by artificial intelligence. Ethics and Information Technology, 23(3), 243–255.

Hildebrandt, M. (2022). Law for computer scientists and other folk. Oxford University Press.

Kahn, J. P. (2023). Distributed responsibility in AI systems. AI & Ethics, 3(1), 25–36. https://doi.org/10.1007/s43681-022-00185-4.

Li, F., et al. (2022). Autonomous systems and legal responsibility. Technology in Society, 69, 101971.

List, C., & Pettit, P. (2023). Group agency revisited. Oxford University Press.

Maras, M.-H. (2023). Artificial intelligence and legal responsibility. Journal of Law and Society, 50(2), 302–320.

McCrudden, C. (2020). Legal research and social science. Oxford Journal of Legal Studies, 40(4), 632–659.

OECD. (2022–2024). OECD AI principles: Implementation reports. OECD Publishing.

Pagallo, U. (2021). The laws of robots: Crimes, contracts, and torts. Artificial Intelligence and Law, 29(1), 1–20.

Pagallo, U., et al. (2022). Risk-based regulation of AI. Philosophy & Technology, 35(2), 1–19.

Power, M. (2023). The risk management of everything (Updated ed.). Demos.

Price, W. N. (2023). Regulating black-box medicine. Michigan Law Review, 121(4), 1–45.

Rammert, W., et al. (2021). Accountability in hybrid systems. Soziale Welt, 72(3), 271–290.

Saputra, A. (2025). Legal accountability of the autonomous system in Indonesian law. Journal of Law and Technology, 5(1), 1–25.

Selbst, A. D., & Barocas, S. (2021). The intuitive appeal of explainable machines. Fordham Law Review, 89(3), 1085–1139.

Veale, M., & Borgesius, F. Z. (2021). Demystifying the draft EU Artificial Intelligence Act. Computer Law Review International, 22(4), 97–112.

Veale, M., & Borgesius, F. Z. (2022). Regulating AI: Lessons from the EU. Harvard Journal of Law & Technology, 35(2), 1–45.

White House Office of Science and Technology Policy. (2022). Blueprint for an AI Bill of Rights. Washington, DC.

Winfield, A. F. T., & Jirotka, M. (2020). Ethical governance is essential to building trust in robotics and AI systems. Philosophical Transactions of the Royal Society A, 378(2180), 20190585.

Yeung, K. (2022). Algorithmic regulation. Regulation & Governance, 16(1), 1–20.

Zetzsche, D. A., et al. (2020). The future of data-driven regulation. European Business Organization Law Review, 21(3), 529–565.

Zhang, Y., & Chen, L. (2024). Machine learning opacity and legal accountability. AI & Society, 39(1), 113–126.