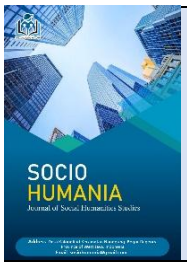

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Artificial Intelligence and Legal Personhood: Ethical, Regulatory, and Accountability Challenges in Contemporary Jurisprudence

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ABSTRACT

This study examines the growing debate surrounding the possibility of granting legal personhood to artificial intelligence (AI) systems within contemporary legal frameworks. As AI technologies become increasingly autonomous in decision-making, innovation, and economic interactions, questions arise concerning accountability, liability, and ethical governance. Using a qualitative library research approach, this study analyzes scholarly literature, legal theories, and global regulatory developments related to AI personhood. The discussion explores historical precedents of non-human legal entities, including corporations and natural objects, and compares them with emerging proposals for electronic legal personality. The findings reveal that while functional legal recognition may offer practical solutions for liability and compensation, current AI systems lack consciousness, moral agency, and intentionality required for full legal personhood. Consequently, most jurisdictions prefer human-centered regulatory models emphasizing transparency, oversight, and institutional accountability. The study concludes that extending legal personhood to AI remains premature and that adaptive governance frameworks are more appropriate for managing future AI-related legal challenges

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INTRODUCTION

The growing complexity of artificial intelligence (AI) has prompted legal scholars to revisit foundational concepts of personhood in law. Historically, legal personhood has been granted to a range of entities, including corporations, ships, deities, and even rivers, not because they possess consciousness or morality, but due to practical and jurisprudential needs. As AI systems become increasingly autonomous, capable of making decisions, engaging in transactions, and even creating intellectual property, the question arises: should they be granted a form of legal personhood? This chapter explores the evolving debate by considering

legal precedents, philosophical and ethical arguments, recent judicial developments, and the practical implications of granting AI any degree of legal recognition akin to personhood. Beyond the mere facilitation of creative tasks, the integration of autonomous systems into the innovation pipeline challenges the traditional nexus between human effort and legal entitlement (Raghavender & Singh, 2023; Thiruveni & Brinda, 2025).

This evolution necessitates a critical assessment of whether current frameworks—which rely on human agency for the attribution of authorship and inventorship—can remain coherent as the degree of algorithmic autonomy increases (Arikan, 2026; Kabir, 2026). Such structural tension is particularly evident in the global resistance to granting legal persona to generative systems, where courts maintain that inventorship must remain anchored in human accountability (Kabir, 2026; Nastasya & Santoso, 2025). Critics of this rigid human-centric approach contend that extending legal personhood could resolve pressing dilemmas concerning liability and the fair attribution of rights in autonomous decision-making environments (Najar & Sneha, 2025).

Conversely, sceptics argue that such recognition is merely a normative choice driven by commercial expediency rather than an acknowledgment of internal consciousness (Mik, 2021). Furthermore, the instrumental nature of these legal fictions, historically employed to manage economic and organizational complexities, serves as a significant precedent for developing a functionalist model of personhood that sidesteps the necessity of inherent moral agency (Baeyaert, 2025). By distinguishing between person autonomy and machine autonomy, lawmakers might establish a framework that grants AI specific legal roles without conflating algorithmic output with human moral responsibility (Chia et al., 2023).

This functionalist approach draws support from comparative legal analysis, which suggests that permitting limited, role-specific legal capacity could mitigate existing accountability gaps while bypassing the contentious debate over machine sentience (Inoyatov, 2025; ugli, 2026). Such a distinction ensures that the legal system remains grounded in objective, pragmatic considerations rather than metaphysical assertions regarding an entity's internal properties (Safdari, 2023). Furthermore, proponents of this model advocate for a hybrid liability framework where developers, operators, and end-users share accountability for the outputs generated by these autonomous systems (Nuredin, 2023). By shifting the focus from the nature of the entity to the utility of the legal doctrine, this perspective promotes functional equivalence as a mechanism to stabilize intellectual property regimes amidst shifting creative paradigms.

However, the practical implementation of such models faces severe obstacles, as autonomous systems often operate with a degree of stochastic, fluid agency that complicates the precise tracing of causality required for traditional liability (Mukherjee & Chang, 2025a, 2025b). Furthermore, the inherent lack of moral values and belief systems in machines means that they cannot be held truly accountable for ethical lapses or unintended consequences (Green & Clayton, 2021). Consequently, the potential for institutionalised conflicts arises when legal rights and obligations, originally designed for human agency, are misapplied to non-human tools that lack the capacity for normative judgment (Staszkiewicz et al., 2024). Moreover, granting such status risks obscuring the distinction between developers and autonomous agents, potentially creating significant "responsibility gaps" where no natural person can be held liable for harmful machine outputs (Raskulla, 2023).

The question of whether Artificial Intelligence (AI) should be endowed with legal personhood lies at the intersection of transformative technology and foundational legal principles. Historically, legal systems have extended personhood, primarily for pragmatic

reasons, to entities such as corporations, deities, and natural features like rivers, mountains, trees within certain limits.[2] As AI systems are becoming increasingly autonomous and refined, capable of making decisions and entering economic interactions, so debates have escalated regarding whether these AI systems warrant a novel legal status such as "electronic legal persons," capable of holding rights and bearing responsibilities (Chesterman, 2020).

This debate is particularly pronounced within the European Union, where the 2024 AI Regulation explicitly avoids conferring such status despite the system's pervasive influence across Industry 4.0 and beyond (Martınek, 2025). Instead, emerging regulatory strategies focus on enhancing transparency and traceability, ensuring that liability remains firmly rooted in human or corporate agency to prevent the dilution of responsibility (Singhal & Sharma, 2025; Yehya & Djillali, 2025). This approach reflects a broader preference among jurists to address the risks inherent in machine autonomy by adapting existing liability models rather than granting independent legal status (Novelli et al., 2021). This strategy often advocates for mechanisms such as compulsory insurance, strict liability, or no-fault systems to balance the competing interests of manufacturers, users, and injured third parties (Dešić, 2025).

However, significant objections persist to granting AI legal personhood. Critics argue that AI lacks consciousness, intent, moral agency, and genuine free will—attributes central to traditional notions of personhood. Moreover, such recognition could undermine accountability. By serving as an ethical scapegoat, legal personhood may inadvertently insulate developers and corporations from the legal consequences of their design choices, effectively shielding them from the liability associated with algorithmic opacity (Mannobova, 2025).

RESEARCH METHOD

This study employs a qualitative library research method to examine the legal, ethical, and regulatory debates surrounding artificial intelligence (AI) personhood. The research relies on secondary data collected from academic journals, legal documents, books, conference papers, and international regulatory reports related to AI governance, legal theory, accountability, and technological ethics. Relevant literature was obtained from reputable databases such as Scopus, Google Scholar, JSTOR, ScienceDirect, and other peer-reviewed sources published primarily within the last five years to ensure the relevance and contemporaneity of the discussion. The study uses a descriptive-analytical approach to identify and compare various legal theories, philosophical perspectives, and international regulatory frameworks concerning AI legal personhood. Furthermore, qualitative content analysis was applied to interpret recurring themes related to accountability, liability, transparency, moral agency, and institutional responsibility in AI systems. Through this method, the research aims to provide a comprehensive understanding of the current legal position of AI and the future implications of autonomous technologies within modern jurisprudence.

RESULT AND DISCUSSION

Expanding Legal Personhood: Precedents and Analogies

Nearly all legal systems worldwide have long treated nonhuman entities as persons for legal convenience. India is no exception; for instance, its Supreme Court has conferred juridical personhood on institutions, deities, and even rivers (Salim, 2017) when justice or social utility

demanded it. Similarly, corporations—despite being devoid of consciousness—are recognized as "artificial persons" capable of entering contracts and being sued (Igbokwe, 2024). These precedents provide compelling legal analogies for extending personhood to artificial intelligence on instrumental grounds. Such functional personhood would facilitate specific legal remedies, such as the ability to examine an autonomous system as a witness to gather evidence regarding its internal decision-making processes (Bottomley & Thaldar, 2023).

Moreover, this procedural integration could compel developers to design systems that maintain transparent, auditable decision logs, thereby bridging the current accountability gap inherent in opaque deep learning architectures (Mannobova, 2025). Such a structural mandate would essentially align AI regulation with the operational requirements of corporate governance, where the entity's legal standing is inextricably linked to the duties of its human overseers (List, 2021). Consequently, adopting this framework acknowledges that a robot's electronic personality functions less as an autonomous moral agent and more as a liability-bearing mechanism for damages resulting from its independent, non-human decision-making processes (Hauer, 2022). By emphasizing this instrumental role, lawmakers can avoid the anthropomorphic pitfalls associated with attributing genuine moral or legal personhood to complex, distributed socio-technical systems (Vacek, 2025).

Indeed, this functional approach addresses the "culpability gap" by ensuring that victim compensation remains achievable even when human fault cannot be clearly established within the complex network of design and deployment (Sio & Mecacci, 2021). This shift toward a "Technological Duty of Care" essentially decouples liability from the traditional requirement of *mens rea*, prioritizing systemic accountability over the elusive search for human intent (Dionisio, 2026). Such an evolution in jurisprudence necessitates a transition toward a "Functional Liability Model," which prioritizes regulatory outcomes over the traditional reliance on subjective mental states in tortious and criminal proceedings (Dionisio, 2026). By concentrating first-line liability within a dedicated entity, this model replaces diffuse responsibility with a clearly defined locus of accountability for specific AI deployments (Labo, 2025).

This framework effectively mitigates the fragmentation of responsibility across complex supply chains by grounding the legal entity within a transparent charter of auditability and mandatory human oversight (Labo, 2025). Furthermore, this regulatory architecture prevents the dangerous phenomenon of "de-responsibilisation," ensuring that the human agents behind an autonomous system remain within the legal reach of the law (King et al., 2021). In this regard, adopting strict liability or risk-based regulations serves to counterbalance the innovation-driven risks inherent in opaque autonomous technologies (Singh, 2025). By establishing a clear nexus between algorithmic output and institutional accountability, this transition mitigates the "Black Box" dilemma where non-interpretable decision-making processes would otherwise preclude traditional tort claims (Dionisio, 2026).

In the European Union, an early 2016 proposal suggested classifying sophisticated autonomous robots as "electronic persons," thereby holding them responsible for any harm they cause(Brant, 2016). Although this idea sparked significant academic and legal debate, it has yet to be incorporated into policy. Instead, current initiatives emphasize a fragmented liability regime that partitions responsibility among conceivers, programmers, and operators, rejecting the notion of an independent legal subject (Braun, 2025). This shift reflects a cautious regulatory posture that prioritizes the harmonization of existing legal frameworks, such as the EU Artificial Intelligence Act, over the creation of novel legal entities (Anggara, 2026).

This trend highlights the ongoing friction between the desire for regulatory simplicity and the necessity of addressing the unique, decentralized nature of the "AI Agents Economy" (Mordi, 2026). Consequently, legislative efforts currently prioritize a risk-based approach that calibrates regulatory standards based on the intensity of threats posed by specific systems (Negri, 2021). In contrast to the creation of autonomous legal subjects, this methodology focuses on maintaining clear lines of accountability for persons and bodies responsible for the technology, thereby avoiding the necessity of granting legal personality to the systems themselves (Truby et al., 2021).

Furthermore, this strategy acknowledges the fundamental tension between fostering innovation and ensuring robust oversight, ultimately favoring a model that integrates mandatory responsibility mapping to bridge identified liability gaps (Mordi, 2026). In this context, the integration of mandatory liability insurance coverage and the establishment of specific safety standards emerge as vital components for mitigating potential harms caused by autonomous agents (Kovač, 2021). These mechanisms ensure that compensation is not thwarted by the "black box problem," where the opacity of deep-learning architectures makes proving specific algorithmic causation excessively difficult for injured parties (Podder, 2026).

Criteria for AI Personhood: Philosophical and Legal Considerations

The central debate on AI's potential legal personhood hinges on whether AI possesses the essential attributes required for personhood. Legal theorists, philosophers, and jurists have long explored the concept of legal personhood, proposing various criteria an entity must meet to qualify as a "person" in law or ethics. These discussions often emphasize the capacity for moral agency, autonomous intent, and the ability to bear rights and obligations, which remain contentious when applied to non-biological systems (Chaffer et al., 2024; Xudaybergenov, 2023). Conversely, proponents of an instrumentalist perspective argue that legal personhood should be granted based on an entity's functional capacity to learn and act autonomously, rather than requiring traditional moral or cognitive indicators (Mengual, 2024).

Influential thinkers have shaped this discourse. Hans Kelsen, a prominent legal theorist, views legal personhood as a juridical fiction created for convenience, stating that "a legal person is not a real being but a point of imputation in a system of norms" (Ward, 2025). For Kelsen, personhood does not necessitate consciousness or moral agency; it is a construct for assigning rights and duties. Following this logic, granting electronic personality would function as a similar mechanism for managing the risks of autonomous agents by tethering liability to a defined entity rather than an elusive human agent (Cheong, 2021). Such an instrumentalist approach provides a pragmatic solution for victim compensation, as it bypasses the philosophical impasse regarding consciousness while ensuring that autonomous systems are effectively integrated into existing liability frameworks (Konidena et al., 2024; Zhang & Zhang, 2023).

However, the practical implementation of this "electronic personhood" remains contingent upon reaching a consensus regarding the threshold of sophistication at which an AI's autonomy necessitates a shift from property-based status to an independent legal identity (Eldakak et al., 2024; Karnouskos, 2021). Such a threshold must also address whether these entities should maintain minimal capital or mandatory insurance to ensure they serve as a viable entry point for litigation (Guerra et al., 2021). Moreover, legal systems must resolve how these entities would demonstrate the necessary agency to enter into contracts or stand in

court, effectively bridging the gap between algorithmic autonomy and the procedural requirements of existing civil law (Conca, 2022).

Integrating these sophisticated systems into the legal order also necessitates a re-evaluation of current liability models, particularly the extension of vicarious liability to situations where machines function as human auxiliaries to prevent the avoidance of responsibility (Wendehorst, 2022). Recent developments, such as the emergence of organoid intelligence, further complicate this discourse by introducing biological components that challenge the traditional boundary between synthetic and natural agents (Lin, 2025). This hybridization forces a re-examination of whether traditional legal fictions, historically reserved for corporations or inanimate entities, remain sufficient to govern entities possessing both code-based autonomy and neural-like biological structures (Raghunath, 2026).

Similarly, H.L.A. Hart emphasizes the functional aspects of legal personhood, identifying the capacity to hold rights and duties, and to participate in legal relations. His approach prioritizes the role of personhood within legal systems over metaphysical qualities. By shifting the focus from internal cognitive states to the external performance of specific duties, this functionalist interpretation enables the law to treat sophisticated software agents as discrete addressees of liability (ugli, 2026). This functional paradigm mirrors the historical evolution of corporate personhood, where the legal entity serves as a vessel for centralizing risk and facilitating accountability without requiring the moral personhood associated with human beings (Dionisio, 2026).

In contrast, Immanuel Kant's moral philosophy defines personhood through rational autonomy, the capacity for moral judgment, and treating individuals as ends-in-themselves—foundations for modern human rights. Kantian criteria typically exclude AI due to its lack of true autonomy and moral agency. Such a stringent requirement for inherent moral worth renders the pursuit of full legal status for artificial entities inherently problematic, as these systems possess neither the capacity to freely choose their own ends nor the ability to experience suffering (Rompaey & Olsen, 2025). Consequently, this incompatibility necessitates an alternative regulatory approach that addresses emergent agency through the lens of collective responsibility rather than individual moral desert (Timothy, 2026).

Drawing from these theories, the core attributes for legal personhood include Consciousness, moral agency, and intent; Capacity to act as a rights-holder and duty-bearer; and Emerging frameworks, such as agency, theory-of-mind, and self-awareness (Ward, 2025). Furthermore, contemporary legal scholarship often categorizes these requirements into specific indicators like intentionality, receptivity to reasons, and second-order desires, reflecting an attempt to operationalize personhood for non-biological entities.

These scholarly attempts to codify criteria underscore that defining "person" is arguably less significant than identifying the precise substantive rights and duties required for effective regulation (Bublitz, 2022). This suggests that legal frameworks should pivot toward a modular approach, calibrating specific regulatory entitlements and burdens to an entity's functional roles and potential societal impact rather than a uniform status (Saraswathy, 2025). This shift aligns with the "Legal Platform" model, which proposes a functional structure bundling insurance, registration, and guardianship to address liability risks before contemplating broader subjecthood (Yadav & Zehra, 2026).

The critical question is whether AI meets these standards. Current AI lacks subjective experience (consciousness), empathy, moral agency, and free will (intent). While AI can simulate decision-making, it cannot independently hold rights or bear duties, as human oversight remains essential. Even proposed emerging criteria—agency, theory-of-mind, and

self-awareness—are rarely satisfied by existing systems(Ward, 2025). Consequently, the prevailing scholarly consensus maintains that artificial entities are unable to comprehend the moral point of view or internalize social norms, effectively precluding them from inclusion within our moral universe (Constantinescu et al., 2021).

Nonetheless, this exclusion does not necessarily negate their potential for legal subjectivity, as legal systems have historically decoupled personhood from the requirements of sentience or reason (Wojtczak, 2021). By decoupling status from inherent moral qualities, regulators may instead focus on the instrumental utility of granting limited, task-specific legal agency to facilitate the resolution of complex liability questions (Das, 2025). This pragmatic approach avoids the impasse of metaphysical debate by treating legal capacity as a bundle of functional permissions tailored to specific technological contexts rather than an ontological status (Das, 2025). Such a shift compels legal scholars to confront the "inscrutability paradox," where the inherent complexity of autonomous systems threatens to foster a "responsibility gap" that could, if left unaddressed, allow AI personhood to function as a shield for capital (Lee, 2026).

Regulatory and Judicial Landscape

1. Global Developments in Intellectual Property and Personhood

A prominent and widely publicized event in the discourse on artificial intelligence and legal personhood occurred in October 2017, when Saudi Arabia granted citizenship to "Sophia," a humanoid robot developed by Hanson Robotics. This marked the first time a nation had extended any form of legal status—however symbolic—to an AI entity. Sophia, equipped with facial expressions and basic conversational AI, was presented on stage at the Future Investment Initiative conference in Riyadh, where the announcement was made.

Although no legal rights or obligations were clearly articulated with this granting, the move drew global criticism and debate for its symbolic implications, especially given Saudi Arabia's complex citizenship laws for humans, particularly women and migrant workers. Many scholars and observers viewed the gesture not as a genuine extension of legal personhood, but as a publicity stunt aimed at promoting Saudi Arabia's Vision 2030 initiative and projecting the Kingdom as a tech-forward nation. Nevertheless, the event sparked widespread discussion about the future of non-human legal status, the ethical treatment of AI, and whether such recognition should be purely symbolic or grounded in actual legal frameworks (Dvorsky, 2017).

Similarly, Japan's 2017 decision to issue a permanent residency permit to a Microsoft-developed chatbot demonstrates an alternative trajectory, treating algorithmic software as a participant within a regulatory framework typically reserved for non-national workers (Kerekes, 2023). Beyond these symbolic gestures, the debate has evolved into concrete legal battles, such as the contentious DABUS patent cases where jurisdictions like South Africa and Australia have diverged significantly from the United Kingdom and the United States regarding the potential for AI to be recognized as an inventor. These rulings highlight a deepening international fragmentation, as the Artificial Inventor Project continues to challenge established norms that restrict patent authorship strictly to natural persons (Gunkel, 2023; Pacholska, 2022).

These incidents, ranging from citizenship status to residency permits, reflect a broader pattern of "individuation" where media apparatuses and creators promote the fantasy of robot autonomy by obscuring the human labor and engineering behind these systems (Romić, 2021;

Soh, 2023). This trend toward the anthropomorphization of artificial entities is further complicated by the use of emotive language by researchers to describe simple automated systems, which risks obscuring the reality of their lack of genuine sentience (Placani, 2024). This strategic anthropomorphization serves to distract from the precarious conditions of the human "clickworkers" in the Global South whose labor—such as content moderation or data labeling—is essential for the functionality of these systems (Hermann, 2021).

The Artificial Inventor Project, advocating IP recognition for AI-generated inventions, has catalyzed legal confrontations across jurisdictions. Courts in Australia, the U.K., U.S.A., Switzerland, and the European Patent Office have consistently rejected granting inventorship to AI, affirming that only natural persons may receive such recognition (Thaler, 2021). Conversely, the initial recognition of DABUS as an inventor by South African and Australian courts underscores a profound legislative divide, as those jurisdictions prioritized the system's innovative output over traditional requirements for human authorship (Alegre, 2024). However, these temporary judicial victories were largely undermined by subsequent appeals, reinforcing a global consensus that restricts patent ownership to human agents (Ren & Ma, 2024).

India follows the global consensus; AI cannot be recognized as an inventor under current law (Rekhi, 1981) Inventorship must remain with a human—someone who has contributed the inventive concept—even if an AI system executed or generated it. For AI-generated inventions to be patentable, one must frame the invention such that a human inventor is named, usually the user or developer guiding the AI. Without legislative changes to explicitly broaden the definition, recognizing AI as an inventor remains untenable in India for now. Furthermore, the current Indian patent regime remains largely silent on whether AI-generated innovations satisfy the criteria of being novel and non-obvious, creating a lacuna for practitioners navigating the interface between human ingenuity and algorithmic automation (Pillai, 2025).

Moreover, the lack of clear guidelines regarding the allocation of rights among multiple stakeholders—such as developers, operators, and institutional entities—complicates the assignment of patent protection for collaborative AI-generated works (Igbinenikaro & Adewusi, 2024). This fragmentation is further exacerbated by the absence of standardized disclosure requirements, which creates doctrinal inconsistencies in assessing the "inventive step" when the underlying algorithmic processes remain opaque (Singh & Singh, 2026). As these autonomous systems move beyond mere tools toward becoming generative agents, the fundamental tension between human-centric inventorship requirements and the practical realities of machine-led discovery risks destabilizing global innovation incentives (George & Walsh, 2022; Nadgir et al., 2025).

This paradox is particularly acute in fields like biotechnology, where systems like AlphaFold autonomously generate complex genetic innovations without direct human guidance, thereby challenging traditional frameworks that demand a human inventor to validate the inventive process (Patwal, 2026a, 2026b). Consequently, current Indian patent standards regarding the assessment of non-obviousness struggle to account for the heightened efficiency and unpredictability inherent in machine-driven pharmaceutical development (Kumar, 2025). This jurisdictional rigidity necessitates a comprehensive legislative review to reconcile the "personhood" requirement for inventors with the increasingly decentralized nature of algorithmic research and development (Singh & Singh, 2026).

2. *Liability and Legislative Responses*

In recent years, several jurisdictions have taken proactive legislative steps to address artificial intelligence's growing influence, particularly regarding the boundaries of legal personhood. In the USA, for instance, states such as Idaho, Utah, and North Dakota have enacted laws explicitly prohibiting the recognition of AI systems as legal persons. These statutes prevent AI from owning property, entering contracts, or engaging in personal relationships like marriage with humans, thereby preempting future attempts to confer such rights via courts or administrative actions. They reflect a firm position that legal personhood—and its associated rights and responsibilities—should remain exclusive to humans and human-controlled entities, such as corporations (Guardian, 2025).

Complementing these state-level prohibitions, the European Union has moved toward a horizontal regulatory framework aimed at balancing innovation with fundamental rights through the AI Act. This legislative shift emphasizes technological transparency and risk-based governance, addressing the inherent opacity of algorithmic decision-making processes that characterize contemporary machine learning applications (Ganguli, 2024). By enforcing mandatory disclosure of training data and ensuring human oversight, this regulation seeks to mitigate the legal uncertainties surrounding liability and intellectual property ownership in automated systems (Poddar & Rao, 2024). Such frameworks are essential, as the collaborative nature of machine learning and the frequent reuse of existing datasets complicate the clear attribution of contributions among various stakeholders (Husnain et al., 2023).

Furthermore, the integration of these systems into drug discovery necessitates contractual clarity regarding the ownership of AI-generated outputs, as current intellectual property laws often fail to distinguish between the rights of the software developer and those of the pharmaceutical entity employing the system (Narayanan et al., 2022). To mitigate these disputes, companies must establish robust internal protocols that explicitly define the attribution of data rights and patent ownership during the initial procurement phase (Somara et al., 2025). Moreover, as pharmaceutical companies increasingly integrate algorithmic tools, they must also navigate evolving data protection statutes that govern the utilization and cross-border sharing of sensitive patient information for machine learning analysis (Shaki et al., 2024).

Adherence to stringent regulatory frameworks—such as the General Data Protection Regulation in Europe and the Health Insurance Portability and Accountability Act in the United States—is therefore mandatory to ensure that the ingestion of health-related datasets for model training remains compliant with fundamental privacy rights (Crisafulli et al., 2024). To further ensure safe and equitable deployment, regulatory bodies are increasingly prioritizing the development of harmonized global frameworks that mandate human oversight to mitigate algorithmic biases and ensure transparency in life-critical AI applications (Carini & Seyhan, 2024; Mirakhori & Niazi, 2025). These initiatives aim to reconcile the accelerated pace of molecular design with the imperative for ethical governance, particularly regarding justice and patient safety (Yadav3, 2026).

At the international level, the European Union's Artificial Intelligence Act and the Council of Europe's Framework Convention on AI, Human Rights, Democracy, and the Rule of Law adopt a complementary yet equally resolute strategy. Rather than granting legal personhood to AI, these frameworks prioritize accountability, transparency, and human oversight in AI deployment. Such regulatory mechanisms serve as a critical buffer against the ethical risks inherent in autonomous drug discovery, specifically addressing concerns

surrounding algorithmic bias and the necessity for robust validation of machine-generated pharmacological results (Bari et al., 2025).

The EU Act, in particular, promotes a human-centric governance model by imposing rigorous evaluations, compliance requirements, and clear human accountability for high-risk systems. Both instruments eschew new legal categories for AI, instead upholding the principle that humans bear ultimate responsibility for AI-driven decisions and actions. Together, they exemplify a cautious, structured approach to AI governance that mitigates societal risks without redefining foundational notions of legal personhood. These international efforts underscore that while adaptive regulatory models are necessary to manage the nuances of real-time learning and validation, the core objective remains the integration of ethical safeguards into the development lifecycle (Warokar & Lote, 2024).

Ongoing efforts by the WHO and ITU to establish standardized benchmarking processes further complement these governance models, as they seek to formalize criteria for decision autonomy and the necessary scope of human oversight (Baumgart, 2024). Furthermore, regulatory agencies must remain agile, continuously refining these oversight mechanisms to address the evolving ethical implications of data quality and reproducibility inherent in AI-driven pharmaceutical innovation (Devi & Bhavitha, 2025; Yadav3, 2026). As these agencies work toward global standardization, they must explicitly address the persistent regulatory gaps that currently hinder the scalable, safe implementation of therapeutic innovations.

Implications for Accountability, Ethics, and the Future

1. Safeguarding Accountability

One of the most pressing issues in the debate over granting legal personhood to artificial intelligence is the risk of eroding human accountability. Recognizing AI systems as legal persons would raise significant concerns about their actual capacity to bear meaningful responsibility. Unlike human individuals or corporations, which possess tangible assets and governance structures, AI lacks the financial and moral means to fulfill obligations, pay damages, or adequately respond to claims from harm it causes. This could create "unfunded personhood," where liability is nominally assigned to AI, leaving victims without effective legal redress.

Developers or corporations might exploit such arrangements to offload responsibility, using AI as a shield against scrutiny or sanctions. Maintaining a clear line of accountability that traces back to human actors—such as designers, owners, or deployers—is therefore essential to uphold the integrity of the legal system and protect the rights of affected parties. Consequently, integrating layers of supervisory oversight—ranging from human-on-the-loop to human-in-the-loop configurations—serves as a necessary procedural safeguard to ensure that agency remains tethered to accountable entities throughout the entire lifecycle of an algorithmic application (Derraz et al., 2024). This shift toward structured oversight reflects a broader transition in industrial standards, where analogous guidelines to Good Laboratory Practice are being adapted to ensure that AI-designed experiments are fully documented, reproducible, and safe (Seal et al., 2025).

Furthermore, as these systems continuously evolve, regulatory bodies are tasked with developing new standards capable of assessing the safety and efficacy of perpetually learning technologies without compromising patient welfare (Udegbe et al., 2024). By mandating algorithmic transparency and prioritizing data quality, these frameworks help close the

accountability gap that emerges when complex models function beyond the direct control of their human operators (Naik et al., 2022), (Bilgin et al., 2024). This ensures that the "moral crumple zone" phenomenon, where human operators inadvertently absorb excessive blame for complex system failures, is mitigated by defining clear, traceable chains of responsibility (Natali et al., 2025). By establishing these robust governance frameworks, organizations can foster trust through institutional oversight rather than attempting to anthropomorphize the algorithms themselves (Chen & Esmaeilzadeh, 2024).

Alternatively, researchers suggest that enhancing the ability of humans to be fully answerable for autonomous actions can restore the relational dynamics of responsibility that legal frameworks alone cannot bridge (Vallor & Vierkant, 2024). By centering professional responsibility on the physician's critical evaluation of AI outputs, stakeholders can better integrate algorithmic insights into established clinical workflows while maintaining human control (Ueda et al., 2023). This balanced approach ensures that moral and legal responsibility remains anchored in human expertise, even as systems gain the capacity for autonomous operation (Hill et al., 2023).

Moreover, establishing a dedicated institutional oversight role, analogous to the function of Institutional Review Boards, provides a necessary mechanism to monitor local algorithm adjustments and ensure the continuous safety of these technologies throughout their operational life cycle (Panch et al., 2022). This framework of continuous monitoring is further bolstered by the FDA's focus on refining regulatory practices through initiatives like the AI/ML Predetermined Change Control Plan, which aims to provide oversight for adaptive algorithms as they evolve in real-world clinical environments (Saenz et al., 2023). Such post-deployment vigilance requires the adoption of continuous audit mechanisms—drawing inspiration from systems like the Federal Aviation Administration's black boxes—to detect and remediate performance deviations in real-time (Sabet et al., 2025).

This integration of quality management systems is essential for capturing real-time safety surveillance and outcome data, thereby aligning algorithmic behavior with established ethical standards (Overgaard et al., 2023). To achieve this, organizations must implement structured processes for internal and external ethics-based auditing, which facilitate the detection of gaps and the necessary corrective actions to maintain systemic trust (Solanki et al., 2022). Moreover, engaging a diverse range of stakeholders—including clinicians, patient advocates, and community representatives—in these auditing cycles is vital to ensure that fairness metrics are evaluated across the entire algorithm life cycle (Chin et al., 2023).

2. *Ethical Ramifications and Human Dignity*

Beyond these legal logistics, granting AI personhood raises profound ethical and philosophical concerns, particularly regarding human dignity and the moral uniqueness of human beings (Guardian, 2025). Recognizing AI as persons risks blurring the ontological and moral distinction between sentient humans and machine tools. This blurring could dilute the conceptual framework of human rights, which rests on human vulnerability, moral reasoning, and empathy. Moreover, psychological studies show that people often respond to advanced AI with emotions akin to those toward humans, including urges to assign blame or punishment despite AI's lack of intention or moral fault (Lima et al., 2020).

This cognitive bias complicates maintaining a rational ethical boundary and could erode the normative weight of human personhood over time. Thus, symbolically elevating AI to legal or moral personhood demands caution to avoid commodifying or devaluing human

status in social and legal contexts. Instead, legal strategies should prioritize frameworks that hold manufacturers and operators accountable under modified negligence and product liability rules, ensuring these systems remain classified as instruments under human control (Nuredin, 2023). Rather than pursuing a status that would equate software with sentient entities, policy should focus on refining legal frameworks to address the specific "black box" nature of these systems, which often obscures the path to remediation when errors occur (Floridi, 2021; Limongi, 2024).

Consequently, fostering transparency in decision-making processes remains a critical prerequisite for meaningful accountability, as it enables the comprehension necessary to attribute liability across the complex interplay between clinicians, developers, and institutions (Aderibigbe et al., 2023; Fahim et al., 2025). In this regard, promoting the active inclusion of end-users in the technological design phase facilitates a more nuanced understanding of AI functionality, which in turn bolsters trust through increased procedural transparency (Murphy et al., 2021). Beyond this procedural focus, some scholars argue that current legal principles are fundamentally ill-equipped to address the autonomy of these machines, as there is often a lack of direct causal links between human interventions and system actions (Gervais, 2021). To resolve this, advocates for a specialized legal status suggest that granting AI "electronic personhood" could provide a procedural mechanism for gathering evidence, similar to the examination of a witness (Bottomley & Thaldar, 2023; Sablone et al., 2024).

Furthermore, implementing an “ethical black box” would serve as a vital evidentiary repository, enabling investigators to reconstruct the system’s internal logic and establish clear lines of accountability in the event of failure (List, 2021). By situating these systems within a framework of quasi-responsibility, stakeholders can facilitate more effective attribution of liability to human actors without erroneously granting algorithms the status of moral agents (Lima et al., 2022). This approach mitigates the "accountability gap" by acknowledging the technical opacity inherent in deep learning architectures while preserving the primacy of human legal agency (Mannobova, 2025).

Ultimately, this shift toward a liability model centered on systemic transparency and institutional oversight offers a more pragmatic alternative to the complexities inherent in legal personhood (Prifti et al., 2022). By replacing the philosophical ambiguity of artificial subjects with enforceable mandates for internal AI Incident Response Teams, policymakers can ensure that evidentiary access remains robust during litigation (Cheong, 2024). Such a model emphasizes that transparency should be context-specific and role-specific, aligning the expectations of clinicians and patients with the technical limitations of black-box models (Kiseleva et al., 2022).

This necessitates the development of domain-specific ethical guidelines that acknowledge the noninterpretable nature of deep learning, ensuring that practitioners are not held accountable for unpredictable outputs beyond their cognitive control (Duffourc & Gerke, 2023; Nasarian et al., 2024). By prioritizing plain-language communication of AI logic, these guidelines can bridge the informational divide between complex technical architectures and the practical decision-making needs of non-expert stakeholders (Resnik & Hosseini, 2024). Furthermore, establishing standardized reporting protocols for diagnostic errors can reconcile the inherent unpredictability of these systems with the requisite clinical standards for patient safety and institutional liability (Cestonaro et al., 2023).

3. Future Directions

Looking ahead, most legal scholars and ethicists advocate regulatory approaches over extending full legal personhood to AI. They view AI as advanced technological products rather than legal subjects, tailoring regulations to address their unique challenges. Potential measures include clear liability frameworks, licensing for high-risk applications, and mandatory safety and transparency standards. These ensure AI's benefits are harnessed responsibly while safeguarding human interests and rights.

Policymakers could additionally consider moving beyond traditional litigation by establishing no-fault compensation programs that assess stakeholder fees to provide redress without requiring the identification of specific causal errors (Maliha et al., 2021). Such administrative solutions shift the regulatory focus from proving subjective intent to implementing a robust "Technological Duty of Care," thereby addressing the vacuum created by non-interpretable decision-making processes (Dionisio, 2026a, 2026b). This transition toward a "Technological Duty of Care" encourages a collaborative approach where developers and healthcare providers share responsibility, acknowledging that the integration of AI into clinical workflows often complicates existing fiduciary duties (Staunton et al., 2024; Trocin et al., 2021).

Moreover, the "black box" nature of these deep learning models renders traditional informed consent processes difficult, as neither patients nor clinicians can fully grasp the underlying logic of a diagnostic recommendation (Coppola et al., 2021; Rajesh et al., 2023). To mitigate this, developers and institutions should prioritize the provision of comprehensive validation reports that clarify data provenance and algorithmic reliability, allowing clinicians to make more informed evaluations of AI-derived outputs (Ye et al., 2025). Integrating these disclosures into electronic health records ensures that clinicians possess sufficient context to exercise independent judgment, fulfilling their professional requirement to adhere to standards of "meaningful human oversight" (Zhang et al., 2025).

At the same time, interdisciplinary research in philosophy, cognitive science, and jurisprudence explores hypothetical thresholds for reassessing personhood, such as machine consciousness, emotional intelligence, or autonomous moral reasoning. Though speculative, these developments highlight the need to prepare legal systems to evolve with technological progress. Until AI exhibits attributes comparable to human cognition and moral agency, extending legal personhood remains premature and hazardous. Instead, focus should be redirected toward strengthening organizational accountability by mandating technology provider oversight and integrating multidisciplinary collaboration between legal experts and technologists (Pham, 2025).

Implementing such integrated oversight mechanisms within regulatory frameworks will effectively mitigate the risks associated with faulty proprietary algorithms and inadequate training protocols in high-stakes environments (Mensah et al., 2024). By mandating rigorous algorithmic auditing and third-party verification, these frameworks ensure that the complexity of deep learning does not supersede the fundamental obligation to maintain patient safety (Contaldo et al., 2024; Mannobova, 2025). Furthermore, maintaining such standards requires a continuous commitment to transparency regarding system performance and the limitations of diagnostic tools, thereby preventing companies from obfuscating blame during instances of technical failure (Goisauf & Abadía, 2022). To support this goal, independent ethics committees must be established to oversee the full lifecycle of AI deployment, ensuring that data resource allocation and clinical practices remain aligned with patient-centered safety standards (Krishnan et al., 2023).

These committees should also enforce strict data governance policies, as outlined in frameworks like the European Union's AI Act, to minimize algorithmic bias and ensure equitable health outcomes (Edpuganti et al., 2025). By shifting the locus of control from individual clinicians to institutional governance models, hospitals can transform procedural compliance into systemic, continuous oversight akin to an editorial board (Goffin, 2025). Such structural reforms would further facilitate the classification of autonomous systems as distinct electronic entities, effectively apportioning liability between the developer and the end-user institution (Zhang & Zhang, 2023). Consequently, legislative amendments must clearly delineate accountabilities across the entire supply chain, ensuring that manufacturers, developers, and healthcare facilities share the burden of maintaining rigorous safety protocols (Mensah & Dutta, 2024).

CONCLUSION

The rapid advancement of artificial intelligence has fundamentally challenged traditional legal concepts of responsibility, liability, and personhood, particularly as AI systems become increasingly autonomous in decision-making and innovation. Although legal systems have historically granted personhood to non-human entities such as corporations and natural objects for functional and administrative purposes, extending similar recognition to AI remains highly controversial because current AI technologies lack consciousness, moral reasoning, free will, and genuine autonomy, which are essential characteristics of legal and ethical personhood. Furthermore, granting AI legal status could create significant accountability gaps by enabling developers, corporations, and operators to shift responsibility onto autonomous systems that are incapable of bearing moral or financial liability. As a result, most contemporary regulatory frameworks, including those developed within the European Union and other jurisdictions, continue to prioritize human oversight, institutional accountability, transparency, and ethical governance rather than recognizing AI as independent legal subjects. Therefore, this study concludes that AI should presently be treated as an advanced technological instrument rather than a legal person, while future governance should focus on strengthening liability mechanisms, ensuring algorithmic transparency, promoting ethical safeguards, and maintaining clear human accountability in all AI-related activities to effectively address the legal and ethical challenges posed by increasingly autonomous technologies.

LIMITATIONS AND FUTURE RESEARCH RECOMMENDATIONS

While This study is limited by its reliance on qualitative library research and secondary academic sources without incorporating empirical legal case studies, interviews, or field-based regulatory analysis. The rapidly evolving nature of artificial intelligence technology and global regulatory policies also means that some legal developments may change significantly over time. Additionally, the discussion primarily focuses on theoretical, ethical, and legal perspectives, with limited attention to technical AI architectures or industry-specific applications.

Future research should therefore incorporate interdisciplinary empirical studies involving legal practitioners, policymakers, AI developers, and ethicists to better understand practical accountability mechanisms for autonomous systems. Comparative studies across jurisdictions are also recommended to examine how different legal systems respond to AI-related liability challenges. Furthermore, future scholarship should explore emerging issues

such as AI consciousness, autonomous moral reasoning, algorithmic transparency, and the implications of advanced generative AI in sectors such as healthcare, finance, defense, and intellectual property. Expanding research into adaptive governance models and international regulatory harmonization will also be essential for addressing the long-term societal impact of artificial intelligence technologies.

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