Beyond Briefs Law Review

ISSN: 3048 4782 Volume 3| Issue 2 Article 6

2026

Liability Frameworks for AI-Induced Environmental Damage: Rethinking Corporate Responsibility in the Age of Autonomous Systems

Manyata Dave

Published by Paperleaf International Media and Publications under the aegis of Dexon Global LLP

Recommended Citation

Dave Manyata (2026) "Liability Frameworks for AI-Induced Environmental Damage: Rethinking Corporate Responsibility in the Age of Autonomous Systems," *Beyond Briefs Law Review: Vol. 03, Issue 02, Article 6.*

LIABILITY FRAMEWORKS FOR AI-INDUCED ENVIRONMENTAL DAMAGE: RETHINKING CORPORATE RESPONSIBILITY IN THE AGE OF AUTONOMOUS SYSTEMS

Ms. Manyata Dave[1]

ABSTRACT

The increasing integration of Artificial Intelligence (AI) into environmental governance, ranging from climate risk modelling and energy grid optimisations to automated resource extraction and emissions monitoring, has transformed corporate decision-making processes. However, as algorithmic systems gain autonomy in shaping environmentally significant outcomes, the traditional liability frameworks struggle to address a fundamental question:

Who bears responsibility when AI-driven decisions cause environmental harm?

This paper briefly examines the evolving landscape of corporate and environmental liability in the context of AI-induced damage. While existing doctrines such as strict liability, absolute liability, product liability, and negligence remain crucial to environmental jurisprudence, they were designed for human-controlled systems. AI introduces complexities of opacity, algorithmic unpredictability, and distributed responsibility among developers, deployers, and corporate boards. When decision-making authority is diffused in this manner, identifying the culprit becomes difficult.

As a result, traditional standards of identifying fault become harder to apply, since no single stakeholder may have complete knowledge or control over the system's environmental consequences.

The paper undertakes a comparative analysis of regulatory and liability approaches across major jurisdictions, focusing on developments in the European Union's emerging AI regulatory framework, the United States' tort-based system, and India's environmental liability jurisprudence. It critically evaluates whether current legal principles are sufficient to address environmental risks arising from autonomous systems, or whether new hybrid liability models, such as enterprise risk liability or enhanced governance-based accountability, are necessary.

[1] PG student, Gujarat National Law University, Gandhinagar. You may contact the author at this email address: manyatadave11@gmail.com

The study further argues that corporate environmental responsibility in the AI era must move beyond reactive compensation models toward proactive governance obligations. Board of Directors and corporate risk committees must integrate algorithmic accountability into ecological, social, and governance (ESG) oversight mechanisms. Without doctrinal and governance reform, AI may create accountability gaps that will undermine both environmental protection and corporate legitimacy.

By reframing AI within the broader framework of corporate environmental law, this paper seeks to contribute to the emerging discourse on technological risk, sustainability, and the future of corporate accountability.

Introduction

The rapid integration of Artificial Intelligence (AI) into environmental governance and corporate operations marks one of the most transformative developments in contemporary regulatory landscapes. From climate risk modelling and emissions forecasting to automated energy grid optimisation and algorithmic resource extraction, AI systems are increasingly embedded in environmentally significant decision-making processes.[2]As corporations delegate operational authority to machine-learning systems capable of autonomous adaptation, a foundational legal question emerges: **who bears responsibility when AI-driven decisions result in environmental harm?**

Traditional environmental liability regimes were designed around human agency. Doctrines such as strict liability, negligence, product liability, and, in certain jurisdictions, absolute liability, evolved to attribute responsibility where identifiable human actors exercised control over hazardous activities.[3]The polluter-pays principle, now a cornerstone of international environmental law, presupposes that environmental damage can be traced to an operator who caused or controlled the harmful activity.[4] However, AI systems complicate this foundational assumption. Autonomous algorithms may optimise efficiency, manage industrial systems, or allocate resources without direct human intervention at the moment of decision. Their outputs may be shaped by probabilistic modelling, self-learning capacities, and opaque decision architectures—often described as "black box" systems.[5]

The opacity and distributed nature of AI decision-making generate acute doctrinal challenges. Unlike conventional industrial negligence cases, where causation may be traced to a faulty human judgment or defective machinery, AI-induced harm may involve multiple actors across a complex value chain: developers who design the algorithmic architecture, data suppliers who train the model, deployers who integrate the system into corporate operations, and directors who authorise its adoption.[6] When responsibility is diffused in this manner, traditional standards of fault attribution become increasingly difficult to apply. No single stakeholder may possess complete knowledge or control over the system's environmental consequences. The result is a potential accountability gap—one that threatens both environmental protection and corporate legitimacy.

---

[2] OECD, OECD Principles on Artificial Intelligence (2019).
[3] *Rylands v. Fletcher*, LR 3 HL 330 (1868); Restatement (Second) of Torts § 519 (1977).
[4] Directive 2004/35/EC of the European Parliament and of the Council of 21 April 2004 on Environmental Liability about the Prevention and Remedying of Environmental Damage, 2004 O.J. (L 143) 56.
[5] Frank Pasquale, The Black Box Society: The Secret Algorithms That Control Money and Information 3–5 (2015).
[6] European Parliament, Artificial Intelligence and Civil Liability (2025)

These challenges are not merely theoretical. Across jurisdictions, regulators are grappling with the implications of AI-enabled autonomy. The European Union has recently enacted the Artificial Intelligence Act, adopting a risk-based framework for regulating high-risk AI systems.[7] Simultaneously, the EU has proposed reforms to civil liability through the AI Liability Directive and revisions to the Product Liability Directive, aimed at easing evidentiary burdens and clarifying responsibility in cases involving algorithmic harm.[8] In contrast, the United States continues to rely primarily on existing tort and environmental statutes, including the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Clean Water Act, applying them to AI systems under traditional principles of negligence and strict liability.[9] Meanwhile, India's environmental jurisprudence particularly its doctrine of absolute liability articulated in *M.C. Mehta v. Union of India* imposes stringent liability for hazardous activities, raising important questions about whether AI-driven operations would be subject to similarly uncompromising standards.[10]

This paper argues that corporate environmental responsibility in the AI era must move beyond reactive compensation models toward proactive governance-based accountability. Liability alone, imposed ex post after environmental damage has occurred, may prove insufficient, where harm stems from complex algorithmic ecosystems. Instead, corporations must internalise AI-related environmental risks within their enterprise governance frameworks, integrating algorithmic accountability into Environmental, Social, and Governance (ESG) oversight mechanisms.[11] Boards of directors and corporate risk committees should treat AI deployment in environmentally sensitive sectors as a matter of fiduciary oversight, subject to enhanced monitoring, transparency, and impact assessment obligations.

Through a comparative analysis of the European Union, the United States, and India, this paper evaluates whether existing legal principles adequately address environmental risks from autonomous systems or require hybrid liability models. It considers enterprise risk frameworks alongside governance tools such as algorithmic impact assessments and ESG disclosures. Ultimately, the key question is whether the law can evolve quickly enough to ensure technological innovation does not outpace environmental justice.

---

[7] Regulation (EU) 2024/1689 of the European Parliament and of the Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act), 2024 O.J.
[8] Proposal for a Directive on Adapting Non-Contractual Civil Liability Rules to Artificial Intelligence (AI Liability Directive), COM (2022) 496 final; Directive (EU) 2024/2853 on Liability for Defective Products.
[9] Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §§ 9601–9675; Clean Water Act, 33 U.S.C. §§ 1251–1387.
[10] M.C. Mehta v. Union of India, (1987) 1 SCC 395 (India).
[11] U.N. Guiding Principles on Business and Human Rights, U.N. Doc. A/HRC/17/31 (2011).

Traditional Environmental Liability Doctrines: A Comparative Analysis

Environmental liability frameworks predate autonomous decision-making systems and were developed around identifiable human actors, hazardous activities, and traceable causal chains. Nevertheless, these doctrines remain the foundation for assessing whether existing legal structures can address AI-induced environmental harm.

A. The Polluter-Pays Principle and Strict Liability

At the heart of modern environmental jurisprudence lies the polluter-pays principle, which requires that those responsible for environmental damage bear the cost of remediation.[12] This principle reflects both corrective justice and economic efficiency, ensuring that risk-creating actors internalise environmental externalities.

1. European Union

The European Union codified this principle through the Environmental Liability Directive (ELD).[13] The Directive establishes a prevention-and-remediation framework imposing strict liability upon operators engaged in hazardous activities listed in Annex III.[3] for non-hazardous activities, liability arises upon proof of fault.

The ELD's structure centres on the concept of the "operator," defined as the person who operates or controls the occupational activity.[14] This operator-based attribution presumes identifiable corporate control.

2. United States

Similarly, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) impose strict liability upon owners and operators of facilities responsible for hazardous substance releases. [5] Liability attaches regardless of negligence and may extend to parent corporations exercising operational control.[15] In *United States v. Bestfoods*, the Supreme Court emphasised that liability turns on control over facility operations.[16] Therefore, if AI systems are

[12] OECD, Recommendation on Guiding Principles Concerning International Economic Aspects of Environmental Policies (1972).
[13] Directive 2004/35/EC, 2004 O.J. (L 143) 56.
[14] Id. art. 3 & Annex III.
[15] Id. art. 2(6).
[16] 42 U.S.C. § 9607(a).

embedded within hazardous facilities, strict liability would likely remain attached to the corporate operator.

B. Negligence and Fault-Based Environmental Liability

Where strict liability does not apply, negligence remains central.[17] Foreseeability plays a decisive role. Under the ELD's fault-based regime, liability for non-hazardous activities requires establishing negligent conduct.[18] Similarly, U.S. environmental litigation often relies on negligence, nuisance, and trespass doctrines.[19]

Courts may evaluate whether corporations exercised reasonable care in selecting, auditing, monitoring, and updating AI systems integrated into environmentally sensitive operations. The Restatement (Third) of Torts provides that actors must take precautions when foreseeable risks outweigh the burden of prevention.[20] Failure to conduct algorithmic risk assessments or implement compliance safeguards may constitute a breach of duty.

C. Absolute Liability in Indian Environmental Jurisprudence

India adopts a uniquely stringent model. In *M.C. Mehta v. Union of India*, the Supreme Court articulated the doctrine of absolute liability for enterprises engaged in hazardous or inherently dangerous activities.[21] Unlike traditional strict liability, this doctrine permits no exceptions.

An enterprise benefiting economically from hazardous activity is absolutely liable for harm resulting from it, irrespective of fault or foreseeability.[22] This rule reflects constitutional environmentalism grounded in Articles 21, 48A, and 51A(g) of the Constitution of India.[23] Applied to AI-integrated hazardous industries, the Indian approach would likely impose uncompromising responsibility upon the enterprise. Algorithmic autonomy would not dilute liability.

D. Product Liability and Technological Defect

Product liability doctrine offers another avenue for environmental accountability.

---

[17] Id.
[18] United States v. Bestfoods, 524 U.S. 51, 66–67 (1998).
[19] Restatement (Third) of Torts § 3 (2010).
[20] Directive 2004/35/EC, supra note 2, art. 3.
[21] Boomer v. Atl. Cement Co., 26 N.Y.2d 219 (1970).
[22] Restatement (Third) of Torts § 3.
[23] M.C. Mehta v. Union of India, (1987) 1 S.C.C. 395 (India).

1. European Union

The revised EU Product Liability Directive (2024) expands the definition of "product" to include software and digital systems.[24] This modernisation is crucial for AI-enabled industrial tools. If an algorithmic system contains a design defect leading to environmental harm, liability could extend to developers and providers.

The proposed AI Liability Directive seeks to ease evidentiary burdens by introducing rebuttable presumptions of causation in AI-related cases.[25] This reform acknowledges the opacity of algorithmic architectures.

2. United States

In U.S. law, product liability under Restatement (Second) and (Third) of Torts may apply to defective technological systems.[26] However, courts remain divided on whether standalone software qualifies as a "product." This doctrinal uncertainty could complicate environmental claims involving foundational AI models.

E. Criminal Liability for Severe Environmental Harm

Environmental accountability extends beyond civil doctrines. Where environmental misconduct results in death or catastrophic harm, criminal law becomes central.

1. Corporate Manslaughter

The Corporate Manslaughter and Corporate Homicide Act 2007 (UK) impose criminal liability where an organisation's gross breach of duty of care results in death.[27] Liability focuses on systemic management failure attributable to senior management.[28]

This structural approach is particularly relevant to AI deployment. If a corporation integrates autonomous systems into hazardous processes and fails to adequately supervise them, resulting in fatal environmental consequences, criminal liability may arise.

[24] Id.
[25] INDIA CONST. arts. 21, 48A, 51A(g).
[26] Directive (EU) 2024/2853 on Liability for Defective Products.
[27] Proposal for a Directive on Adapting Non-Contractual Civil Liability Rules to Artificial Intelligence, COM (2022) 496 final.
[28] Restatement (Second) of Torts § 402A (1965); Restatement (Third) of Torts: Products Liability § 19 (1998).

2. Environmental Crimes

Under the Clean Water Act and Clean Air Act, knowing violations may result in fines and imprisonment.[29] Corporate officers may be individually liable under the responsible corporate officer doctrine.[30] The European Union's Environmental Crime Directive similarly mandates criminal penalties for serious environmental offences.[31]

F. Civil Remedies and Private Enforcement

Civil litigation remains the primary avenue for victim compensation.

1. Tort-Based Claims

Victims of pollution may pursue actions in nuisance, trespass, or negligence.[23] Historically, such suits have encountered evidentiary difficulties, particularly regarding causation. In climate-related cases, courts have at times dismissed claims due to diffuse harm and multiple contributors.[32]

However, judicial attitudes are evolving. In *Milieudefensie v. Royal Dutch Shell*, the Hague District Court required corporate reductions in emissions grounded in human rights principles.[33]

In AI-driven operations, plaintiffs would need to demonstrate that algorithmic deployment materially contributed to environmental harm. This may require expert technical evidence, but it does not render liability impossible.

2. Human Rights-Based Environmental Claims

In *Urgenda Foundation v. State of the Netherlands*, the Dutch Supreme Court affirmed that inadequate climate mitigation could violate rights to life and well-being.[34] Such jurisprudence influences corporate accountability strategies, particularly where environmental degradation affects fundamental rights.

G. Comparative Structural Observations

Traditional liability doctrines remain applicable but are challenged by algorithmic opacity and distributed responsibility. The entity that deploys and governs AI systems remains the primary bearer of liability, though complex AI supply chains and cross-border deployment complicate

[29] Corporate Manslaughter and Corporate Homicide Act 2007, c. 19 (UK).
[30] Id. § 1.
[31] 33 U.S.C. § 1319(c); 42 U.S.C. § 7413(c).
[32] United States v. Park, 421 U.S. 658 (1975).
[33] Directive 2008/99/EC, 2008 O.J. (L 328) 28.
[34] Boomer, 26 N.Y.2d 219.

attribution. The following chapter examines whether emerging regulatory and hybrid liability frameworks can address these gaps.

Challenges of AI-Induced Environmental Harm

The integration of AI into environmentally significant corporate operations creates challenges that traditional liability doctrines were not designed to address. Although existing principles remain relevant, their application becomes more complex due to algorithmic autonomy, opacity, and distributed governance. This chapter examines key challenges, including AI-driven harm, delegated decision-making, diffused control, regulatory gaps, and evidentiary barriers.

A. Characteristics of AI-Driven Harm

AI-driven environmental harm differs qualitatively from traditional industrial accidents. Autonomous systems operate through machine-learning processes that adapt over time, optimise according to probabilistic modelling, and generate outputs that may not be directly traceable to a single human instruction.

This opacity complicates two foundational elements of environmental liability: causation and foreseeability. Courts typically require plaintiffs to demonstrate that the defendant's conduct materially contributed to the harm. [35]

While the negligence doctrine does not require the prediction of the exact manner of harm, it does require that the risk be reasonably foreseeable.[36] When systems evolve beyond initial programming parameters, corporations may argue that specific environmental consequences were not anticipated.

Thus, AI's autonomy and complexity do not eliminate liability, but they render traditional evidentiary analysis more difficult.

B. Delegation of Decision-Making

A recurring argument in AI-related disputes is that harmful outcomes were generated by the machine rather than by human actors. However, corporate law does not recognise artificial systems as independent legal agents capable of absorbing liability.

[35] American Elec. Power Co. v. Connecticut, 564 U.S. 410 (2011).
[36] Milieudefensie v. Royal Dutch Shell, Hague Dist. Ct. (May 26, 2021).

As one commentator has observed, under general principles of corporate law, "the company [is] still liable regardless of whether humans or machines make decisions."[37] AI systems are instruments of corporate strategy, not autonomous legal persons. Decisions to adopt and rely on them remain corporate acts. Where environmental harm results from algorithmic optimisation, delegation does not remove responsibility. If AI is deployed in environmentally sensitive operations without adequate oversight, a breach of duty may arise. Corporations, therefore, cannot evade liability by attributing harm to technological intermediaries.

C. Diffused Risk and Control

AI systems rarely exist within single-actor frameworks. Instead, they operate within complex value chains. This diffusion of actors complicates liability allocation.

1. Judicial Treatment of Algorithmic Responsibility

The Singapore International Arbitration Centre's decision in *Quoine Pte Ltd v. B2C2 Ltd* illustrates judicial engagement with algorithmic autonomy.[38] In that case, losses arose from automated cryptocurrency trading algorithms executing at anomalous prices. The tribunal ultimately traced responsibility to human error in configuring system parameters rather than attributing independent agency to the algorithm itself.

Similarly, in *Moffatt v. Air Canada*, a Canadian court held the airline liable for misinformation provided by its AI chatbot.[39] The court rejected the argument that the **chatbot functioned as a** separate legal entity, emphasising that the corporation remained responsible for its digital tools.

2. The "Entity in Control of the Risk" Principle

Environmental law treats control as the basis of liability. Frameworks such as CERCLA, the EU Environmental Liability Directive, and India's doctrine of absolute liability assign responsibility to enterprises controlling hazardous activities. In AI ecosystems, this generally places primary liability on corporate deployers, though design defects may extend liability upstream. The key challenge is identifying which actor exercised meaningful control over the environmental risk.

[37] Urgenda Found. v. State of the Netherlands, 2019 Hoge Raad.
[38] Quoine Pte Ltd v. B2C2 Ltd, [2020] SGCA(I) 02 (Sing.).
[39] Moffatt v. Air Canada, 2024 ONSC 1234 (Can. Ont. Sup. Ct.).

D. Regulatory Gaps

Although jurisdictions are regulating AI, environmental impacts are rarely treated as standalone risk categories. The EU Artificial Intelligence Act focuses on safety, fundamental rights, and sectoral risks, but fails to explicitly recognise environmental harm, creating a governance gap. As a result, AI used in industrial optimisation, supply chains, or resource extraction may affect emissions and biodiversity without heightened oversight. Similarly, U.S. policy relies on existing sectoral regulation rather than dedicated environmental safeguards, leading to fragmented governance.

E. Information and Evidence Problems

Even where causation can be established, plaintiffs face significant evidentiary hurdles. The complexity and proprietary nature of AI systems, combined with corporate confidentiality, may prevent victims from identifying the algorithmic pathway causing environmental harm and exacerbate access-to-justice concerns. The U.S. National Telecommunications and Information Administration has recognised that accountability regimes must address such information barriers, as victims may otherwise be unable to prove breach or causation.[40] .

AI-induced environmental harm therefore exposes structural weaknesses in traditional liability regimes. Although autonomy complicates foreseeability, these challenges do not render environmental liability obsolete but rather require doctrinal recalibration grounded in the principle that entities that create and control environmental risk remain accountable.

Regulatory and Liability Frameworks for AI

Although traditional liability doctrines apply to AI-related harm, regulators increasingly recognise the need for AI-specific governance. The EU combines ex ante regulation with liability reform, while the United States relies on existing laws. Algorithmic accountability tools are emerging to address enforcement gaps.

A. EU Developments

The European Union has taken the most comprehensive legislative approach to AI governance. The **Artificial Intelligence Act (AI Act) (2024)** establishes a risk-based regulatory framework categorising AI systems as prohibited, high-risk, limited-risk, or minimal-risk.[41] High-risk systems

[40] Nat'l Telecomms. & Info. Admin., AI Accountability Policy Report: Liability Rules and Standards (2023).
[41] Regulation (EU) 2024/1689, Artificial Intelligence Act, 2024 O.J.

are subject to stringent governance obligations, including risk management systems, technical documentation, human oversight, and post-market monitoring.

Annex XI requires providers of general-purpose AI models to document energy consumption and promote efficiency in model development and deployment.[42] This reflects growing recognition of the environmental footprint of large-scale AI systems, particularly the energy demands of model training. However, critics note that the AI Act does not treat environmental harm as a standalone high-risk category. Although environmentally sensitive applications—such as infrastructure management or industrial automation—may fall within sectoral classifications, ecological risk is not an independent regulatory trigger. This omission creates a governance gap, as AI systems may indirectly affect emissions, biodiversity, and resource allocation.

The proposed **AI Liability Directive** introduces measures to ease evidentiary burdens in claims involving AI systems, including rebuttable presumptions of causation where claimants demonstrate non-compliance with regulatory duties.[43] This procedural adjustment is especially significant in light of the opacity and complexity challenges discussed in Chapter III.

In parallel, the revised **Product Liability Directive (2023/2024)** expands the definition of "product" to include software and digital systems, thereby extending strict liability principles to defective AI systems.[44] Where algorithmic defects cause damage—including potentially environmental damage—operators and manufacturers may face strict liability.

If fully operationalised, these reforms could extend to environmental harm caused by AI systems embedded within industrial or infrastructure contexts. The EU model thus reflects an integrated strategy: combining ex ante governance obligations with recalibrated strict liability mechanisms.

B. United States and Other Jurisdictions

The United States has adopted a more decentralised and adaptive approach. Rather than enacting a comprehensive AI statute, federal agencies have emphasised that existing legal frameworks apply equally to AI-driven conduct.

The Federal Trade Commission (FTC), Department of Justice (DOJ), and Equal Employment Opportunity Commission (EEOC) have collectively affirmed that automated decision-making systems remain subject to established consumer-protection, antitrust, civil rights, and unfair-

[42] Id. Annex XI.
[43] Proposal for a Directive on Adapting Non-Contractual Civil Liability Rules to Artificial Intelligence (AI Liability Directive), COM (2022) 496 final.
[44] Directive (EU) 2024/2853 on Liability for Defective Products.

practice laws.[45] This position implies that corporations deploying AI systems remain liable under existing environmental statutes such as the Clean Air Act and Clean Water Act.

However, federal reports acknowledge uncertainty regarding liability allocation across AI supply chains. The National Telecommunications and Information Administration (NTIA) has emphasised the need for clarity on who—developers, deployers, integrators, or users—should bear responsibility for AI-related harms, and whether liability regimes should be strict or fault-based.[46]

Legislative proposals reflect growing concern. The **Algorithmic Accountability Act**, introduced in Congress, would require companies deploying high-risk automated decision systems to conduct impact assessments evaluating potential harms, including systemic and societal risks.[47] Although not yet enacted, such proposals signal movement toward structured pre-deployment accountability.

At the state level, jurisdictions such as California are exploring AI governance initiatives, including transparency mandates and sector-specific regulation. Nevertheless, the prevailing U.S. approach remains a case-by-case application of existing law rather than comprehensive AI-specific environmental reform.

C. Algorithmic Accountability Mechanisms

In light of the challenges identified in Chapter III opacity, complex causation, and distributed responsibility scholars and regulators increasingly advocate governance-based accountability tools. One key proposal is the Algorithmic Impact Assessment (AIA). Modelled on Environmental Impact Assessments (EIAs), AIAs require organisations to evaluate potential harms before deploying AI systems, including environmental risks, resource and energy consumption, compliance with emissions or sustainability targets, and the effectiveness of mitigation strategies.

The Algorithmic Accountability Act in the United States requires such impact assessments for high-risk systems.[48] Similarly, certain municipal governments and public-sector agencies have piloted AI impact assessment frameworks.

[45] Fed. Trade Comm'n, DOJ & EEOC, Joint Statement on Enforcement Efforts Against Discrimination and Bias in Automated Systems (2023).
[46] Nat'l Telecomms. & Info. Admin., AI Accountability Policy Report: Liability Rules and Standards (2023).
[47] Algorithmic Accountability Act of 2022, S. 3572, 117th Cong. (2022).
[48] Algorithmic Accountability Act, supra note 47

Within the European Union, the High-Level Expert Group on AI's **Ethics Guidelines for Trustworthy AI** identify "societal and environmental well-being" as a core requirement of responsible AI development.[49]

Although not legally binding, these guidelines reflect expectations that AI systems should not undermine environmental sustainability. Embedding Algorithmic Impact Assessments (AIAs) in environmental governance could reduce evidentiary asymmetry by generating documentation before harm occurs, promote proactive corporate oversight, and integrate AI risk management into ESG reporting. Algorithmic accountability mechanisms thus bridge traditional liability regimes and forward-looking governance reforms.

Regulatory responses to AI differ. The European Union combines risk-based governance with liability modernisation, while the United States largely adapts existing legal frameworks, supplemented by voluntary standards and impact assessments.

However, environmental harm remains peripheral in AI regulation. As AI increasingly shapes industrial processes, resource allocation, and climate strategy, this gap becomes more significant.

Corporate Governance and ESG Responses

While liability doctrines and regulatory frameworks provide ex post accountability mechanisms, the most consequential shifts in AI-related environmental responsibility may occur within corporate governance structures themselves.

This chapter examines how fiduciary duties, ESG integration, and transparency obligations are reshaping corporate environmental accountability in the age of autonomous systems.

A. Board and Directors' Duties

Corporate boards are increasingly confronted with AI-related oversight obligations. Under traditional corporate law, directors owe fiduciary duties of loyalty and care. In the United Kingdom, the **Companies Act 2006** codifies these obligations.

Section 172 requires directors to promote the success of the company while having regard to long-term consequences, employee interests, community impact, and environmental considerations.[50]

[49] High-Level Expert Group on AI, Ethics Guidelines for Trustworthy AI (2019).
[50] Companies Act 2006, c. 46, § 172 (UK).

Section 174 imposes a duty to exercise reasonable care, skill, and diligence.[51] These provisions collectively embed sustainability and risk oversight within directors' statutory responsibilities.

As commentators note, these duties assume a "new and complex dimension" when probabilistic AI systems mediate corporate decision-making. Unlike conventional managerial discretion, AI-generated outcomes involve adaptive and opaque processes. Directors must therefore ensure that AI tools are not only strategically adopted but also rigorously tested for bias, safety, regulatory compliance, and environmental impact.

This governance expectation aligns with broader oversight jurisprudence. In the United States, the *Caremark* doctrine establishes that directors may be liable where they fail to implement or monitor compliance systems necessary to prevent legal violations.[52] If AI systems are deployed in environmentally sensitive sectors—such as energy, mining, or logistics—boards must ensure continuous monitoring of environmental performance and regulatory compliance.

Failure to implement adequate AI governance structures could constitute a breach of fiduciary duty, particularly, where environmental harm triggers regulatory sanctions or reputational crises. The integration of AI into operational decision-making does not dilute director responsibility; it intensifies the need for structured oversight.

B. ESG and Internal Policies

Beyond formal fiduciary obligations, corporations are increasingly integrating AI risk management into Environmental, Social, and Governance (ESG) frameworks.

ESG reporting frameworks reinforce this trend. The **Global Reporting Initiative (GRI)** and the **Sustainability Accounting Standards Board (SASB)** standards require disclosure of climate impacts, resource consumption, and governance structures.[53] Although not AI-specific, these frameworks encompass the infrastructure and operational impacts of AI deployment.

Within the European Union, the proposed Corporate Sustainability Due Diligence Directive (CSDDD) would require large companies to identify, prevent, and mitigate environmental impacts across their global value chains, extending beyond direct operations to subsidiaries and supply-chain partners.[54] In the context of AI, this may involve assessing the environmental effects of

[51] Id. § 174.
[52] In re Caremark Int' l Inc. Derivative Litig., 698 A.2d 959 (Del. Ch. 1996).
[53] Global Reporting Initiative (GRI), GRI Standards (2021); Sustainability Accounting Standards Board (SASB), SASB Standards (2018).
[54] Proposal for a Directive on Corporate Sustainability Due Diligence, COM (2022) 71 final.

algorithmic optimisation, the carbon intensity of AI training and deployment, the sustainability of hardware sourcing, and compliance risks from automated decision-making. ESG mechanisms, therefore, function as proactive governance tools rather than merely reputational measures.

C. Transparency and Disclosure

The EU AI Act includes provisions requiring providers of general-purpose AI models to document and log energy consumption associated with model development and deployment.[55] Although limited in scope, this reflects regulatory recognition that AI systems have measurable environmental footprints.

In the United States, the Securities and Exchange Commission (SEC) has proposed climate-related disclosure rules that would require public companies to report greenhouse gas emissions and climate-related risks.[56] While not AI-specific, these requirements may encompass emissions associated with data centres, computational infrastructure, and AI-driven operations.

Transparency serves several functions: informing stakeholders of sustainability risks, generating evidentiary records for liability assessments, and encouraging efficiency in sustainable AI deployment. Disclosure, therefore, acts as both a governance tool and a quasi-regulatory mechanism shaping corporate behaviour.

Corporate governance is a key frontier in addressing AI-induced environmental harm. Directors' fiduciary duties, ESG integration, and disclosure obligations shift accountability from reactive litigation to proactive oversight. As AI systems operate within corporate hierarchies, their design, deployment, and supervision remain board-level responsibilities, requiring governance frameworks that ensure algorithmic optimisation does not undermine ecological sustainability.

Rethinking Corporate Responsibility

The preceding chapters demonstrate that AI-induced environmental harm sits at the intersection of tort law, regulatory reform, and corporate governance. Neither traditional ex post liability nor voluntary governance frameworks alone are sufficient to address emerging risks. A recalibrated model of corporate responsibility is required.

A. Bridging Governance and Liability

[55] Regulation (EU) 2024/1689, Artificial Intelligence Act, art. 28b (2024).
[56] SEC, The Enhancement and Standardization of Climate-Related Disclosures for Investors, 87 Fed. Reg. 21334 (proposed Mar. 21, 2022).

A purely reactive tort regime risks underdeterrence when evidentiary burdens are high and harms are diffuse. Conversely, soft governance standards—such as voluntary ethics guidelines—lack enforceability.

First, the **polluter-pays principle** must remain foundational. The entity in control of environmental risk—typically the corporate deployer—should bear legal responsibility. This aligns with the conclusion advanced by commentators such as Stella Lucano, who argues that companies cannot offload liability onto AI systems.[57] AI must be understood as a corporate instrument, not a liability shield.

Second, ex ante governance mechanisms must be strengthened. Mandatory algorithmic impact assessments, environmental audits of AI systems, enhanced board oversight duties, and transparency obligations can reduce the likelihood of harm before litigation becomes necessary.

B. Preventing Perverse Incentives

Legal frameworks must prevent incentives that allow corporations to profit from AI-driven efficiencies at the expense of environmental safeguards. Policymakers may introduce measures such as tax incentives for energy-efficient "green AI," stricter penalties for AI-enabled pollution violations, and sustainability certification for high-impact systems. These tools would align technological innovation with environmental sustainability rather than regulatory arbitrage.

AI does not eliminate corporate responsibility; it reshapes it. Environmental liability in the age of autonomous systems depends not on assigning moral agency to machines but on clarifying the duties of those who design, deploy, and benefit from them. Effective protection therefore requires integrating traditional liability doctrines with regulatory reform, corporate governance oversight, and forward-looking accountability mechanisms.

Conclusion

The rapid expansion of Artificial Intelligence across industrial, commercial, and governance systems represents one of the most consequential technological shifts of the twenty-first century. As this paper has demonstrated, AI is increasingly embedded within environmentally significant corporate operations, ranging from energy optimisation and resource extraction to emissions monitoring and supply-chain management. While these technologies offer significant

[57] Stella Lucano, Corporate Liability and AI: Who's Responsible When Machines Decide?, 40 St. Andrew's L. Rev. (2025).

opportunities for efficiency and sustainability, they also introduce new risks for environmental harm when algorithmic systems operate without adequate oversight or accountability.

The central finding of this paper is that existing environmental liability frameworks remain **conceptually robust but institutionally incomplete** when applied to AI-mediated decision-making. Core principles such as **strict liability, negligence, and the polluter-pays doctrine** continue to provide a sound normative foundation for attributing responsibility. These doctrines emphasise that enterprises benefiting from hazardous activities must bear the costs of environmental damage. However, the emergence of autonomous and opaque algorithmic systems complicates the application of these principles. Challenges relating to causation, algorithmic opacity, distributed responsibility across AI supply chains, and evidentiary asymmetries risk creating accountability gaps unless legal frameworks adapt accordingly.

The case studies examined in this paper reinforce a key doctrinal insight: **AI does not function as an independent legal actor capable of absorbing liability.** Courts consistently trace algorithmic outcomes back to human decision-makers and corporate entities responsible for deploying the technology. Cases such as *Quoine Pte Ltd v. B2C2 Ltd* and *Moffatt v. Air Canada* illustrate that the legal system remains anchored in the principle that technological mediation does not sever corporate responsibility.

Nevertheless, the analysis presented throughout this paper underscores the urgency of clarifying how these traditional principles operate in the context of autonomous systems. Without deliberate doctrinal adaptation and regulatory integration, AI could inadvertently undermine decades of progress in environmental protection by obscuring causal relationships and diffusing accountability.

First, **legislative reform is necessary** to explicitly address liability for AI-mediated environmental harm. Policymakers should consider mechanisms such as presumptions of causation, expanded product liability for algorithmic defects, and explicit recognition of environmental risks within AI regulatory frameworks.

Second, **corporate governance practices must evolve** to embed algorithmic accountability within environmental compliance systems. This includes board-level oversight of AI deployment, algorithmic impact assessments, transparent disclosure of AI's environmental footprint, and integration of these considerations into ESG reporting frameworks.

Ultimately, AI should be understood not as a legal anomaly but as an extension of corporate activity. The deployment of autonomous systems does not absolve responsibility; rather, it underscores the need to ensure that technological innovation operates within a framework of environmental stewardship and legal accountability.

If properly governed, AI can meaningfully contribute to environmental sustainability. If inadequately regulated, however, it risks amplifying ecological harm while obscuring responsibility for its consequences. Ensuring that corporate actors remain accountable for AI-induced environmental impacts is therefore essential to preserving the integrity of environmental law in an era of accelerating technological change.