

Liability in AI-Blockchain-Enabled Autonomous Organizations

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ABSTRACT

As decentralized autonomous organizations (DAOs) mature into AI-enabled, on-chain collectives that can own assets, contract, and act through smart contracts and autonomous agents, the question “who is liable when things go wrong?” becomes central. This manuscript develops a comparative, doctrine-informed framework for allocating liability in AI-blockchain-enabled autonomous organizations (AI-BAOs). We synthesize case law (e.g., CFTC v. Ooki DAO; Sarcuni v. bZx DAO), evolving statutory schemes (Wyoming, Tennessee, Utah, Marshall Islands), and major regulatory instruments (EU AI Act; EU Product Liability Directive; MiCA) to map how tort, contract, securities, consumer, and product liability attach to participants (founders, token-holders, developers), service providers (oracles, custodians), and AI system “providers” and “deployers.” We propose a layered liability model: (1) entity shield (DAO/LLD/DAO LLC statutes), (2) functional roles

(controller, provider, deployer, maintainer), and (3) use-case risk (financial vs. physical-world effects). A ten-jurisdiction comparative table illustrates differential risk under a transparent scoring rubric and shows that jurisdictions with DAO entity statutes reduce member personal-liability exposure but not platform or product-liability exposure when AI systems cause harm. We close with actionable governance patterns—liability-aware bylaws, role-based indemnities, AI assurance dossiers, incident response playbooks, and human-in-the-loop overrides—compatible with current law while remaining technology-agnostic. The analysis clarifies that AI-BAOs are not lawless: liability follows function and foreseeability, while new EU rules extend strict liability to software/AI defects and the U.S. courts have shown willingness to treat token-holder collectives as partnerships where no entity shield exists.

How should liability be allocated in AI-BAOs?

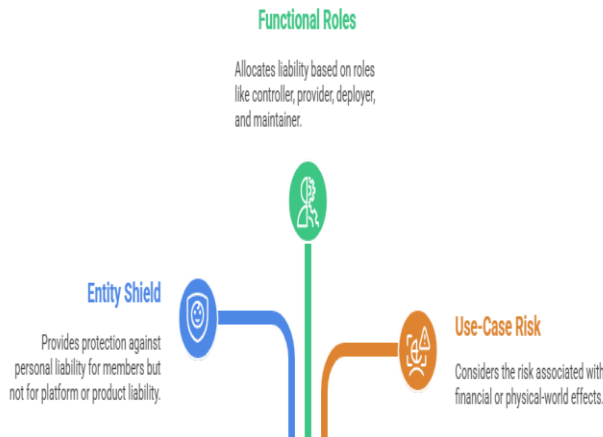


Figure-1. How Should Liability be Allocated in AI-BAOs

Establishing Liability in AI-BAOs

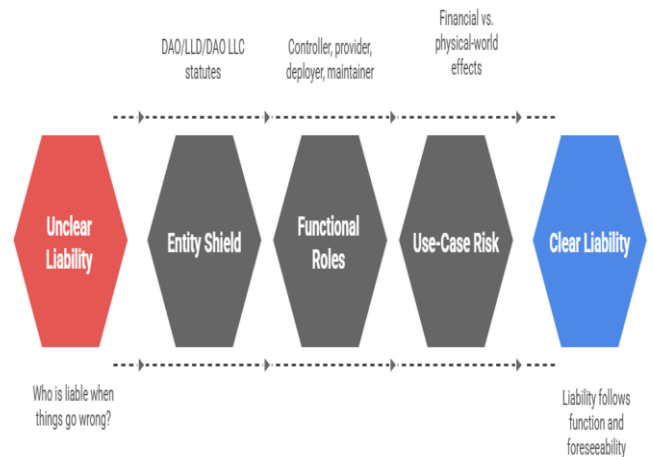


Figure-2. Establishing Liability in AI-BAOs

KEYWORDS

AI-Enabled DAOs, Liability, Product Liability, Securities, Governance, MiCA, EU AI Act, DAO LLC, General Partnership Risk, Safe Harbors

INTRODUCTION

Autonomous organizations mediated by blockchains are no longer limited to token voting over treasuries. Increasingly, AI agents propose, draft, deploy, and execute transactions, policies, and even code updates. In an AI-BAO, models can make or inform decisions, trigger on-chain actions (liquidations, trades, payouts), and interact with off-chain systems via oracles and middleware. This raises a recurring question in both theory and practice: where does liability land when an AI-guided, smart-contract-executed act causes loss?

Three developments make this urgent:

- Judicial signals on DAO status:** U.S. courts have allowed theories that DAOs without entity shields resemble general partnerships, exposing participants to joint and several liability; regulators have also obtained judgments directly against a DAO.
- New EU frameworks that reach AI/software:** The EU AI Act imposes lifecycle obligations on “providers” and “deployers” of AI; the recast Product Liability Directive (PLD) extends strict liability to software and AI and to post-sale changes (e.g., model updates). Together they reshape exposure for builders and operators touching the EU market.
- DAO entity statutes:** Several jurisdictions offer DAO-as-entity regimes (e.g., Wyoming, Tennessee, Utah, Marshall Islands) that can shield members—if properly formed and operated—but do not erase tort or regulatory exposure.

This paper argues that liability in AI-BAOs is best understood through function-based allocation—not labels. If an actor designs, trains, deploys, maintains, or substantially influences an AI system or on-chain module, the law will tend to assign duties (and liability) commensurate with that control, regardless of decentralization rhetoric.

LITERATURE REVIEW

Early foundational work framed “lex cryptographia” and the governance-by-code thesis—suggesting smart contracts could operate as private rule systems. Later critiques emphasized the myth of decentralization and the persistence of power centers (core devs, multisigs, oracle operators). This background sets the stage for AI-BAOs, where algorithmic agency amplifies both benefits and externalities.

- **Governance by code:** Wright & De Filippi (2015) argue code can instantiate rules; their later book (2018) explores the legal frictions when code meets law.
- **Decentralization critique:** Walch (2019) dissects decentralization claims, underscoring accountability gaps—highly relevant when AI systems “decide.”
- **Securities and DAOs:** The SEC’s 2017 DAO Report applied securities law to token offerings and platforms, signposting that legal duties persist even in code-mediated structures.
- **Product liability and AI:** The EU PLD (2024/2853) broadens “product” to include software and strengthens presumptions of defect/causation for complex tech; combined with the AI Act, this pushes AI governance into mainstream compliance.
- **DAO statutes and entity shields:** Wyoming’s DAO Supplement (W.S. §17-31), Tennessee’s DAO LLC amendments, Utah’s LLD framework, and the

Marshall Islands’ DAO Act seek to replace partnership exposure with limited liability—subject to formalities and ongoing compliance.

- **Case law trends:** *Sarcuni v. bZx DAO* allowed a theory that token holders constituted a general partnership; *CFTC v. Ooki DAO* secured default judgment and monetary relief directly against a DAO.
- **Digital-asset infrastructure:** MiCA standardizes EU rules for crypto-asset issuers and service providers and is now applicable in phases (ART/EMT issuers as of 30 June 2024; most CASP rules from 30 December 2024), shaping custodial/oracle exposure around AI-BAOs’ rails.
- **UK trajectory:** The UK Law Commission’s 2024 DAO scoping paper and its digital-assets reform program indicate movement on private-law questions (property, conflict of laws) that affect cross-border AI-BAOs.

Synthesis

The literature converges on two insights: (i) decentralization does not dissolve accountability; (ii) entity-level shields mitigate member exposure but do not absolve functional actors (developers, maintainers, AI “providers/deployers,” or custodial services) from statutory and tort duties.

STATISTICAL ANALYSIS

To illustrate comparative exposure, we coded ten jurisdictions (bloc/state/nation) against five features and computed a Member Liability Risk Score (0–100; higher = greater risk of personal liability for ordinary participants) using a rule-based rubric:

- **DAO statute present** (–20 points);
- **Explicit limited-liability shield** (–10);

- **Recent case/regulatory posture increasing exposure** (+15 to +25);
- **AI/software strict-liability reform in force** (+5 overall to reflect broader ecosystem exposure—not member-specific but raising baseline duty of care);
- **No or unclear shield with active enforcement** (+10).

Sources informing each feature include EUR-Lex and EU explainer pages for the AI Act and PLD, ESMA/CSSF for MiCA timelines, U.S. cases, and DAO statutes noted above.

Jurisdiction (as of 19 Aug 2025)	DAO statute?	Limited liability if compliant?	AI/software product-liability modernization?	Notable case / regulator posture	Member Liability Risk (0–100)
European Union (bloc)	No	—	Yes (PLD 2024/2853)	AI Act in force; PLD expands software/AI defects	55
United Kingdom	No	—	Partial (digital assets property law reforms; DAO scoping)	Law Commission DAO scoping; private-law reforms underway	60

United States (federal)	No	—	No AI-specific PLD	SEC DAO Report; federal enforcement across tokens/markets	65
Wyoming (U.S. state)	Yes	Yes (DAO LLC)	No	Clear DAO regime	35
Tennessee (U.S. state)	Yes	Yes	No	DAO LLC recognition	40
Utah (U.S. state)	Yes (LLD)	Yes	No	LLD statute with explicit personality	38
Vermont (U.S. state)	Yes (BBL LC)	Yes	No	Blockchain-based LLC form	45
Marshall Islands	Yes	Yes	No	DAO Act (2022, amended 2023)	40
Singapore	No	—	Governance framework	Tech-neutral regulation	55

			ks, not strict PLD	n via MAS; no DAO entity	
Australia	No	—	Policy consultations	Active consultations on digital assets/AI	58

Summary: 5/10 jurisdictions surveyed provide a DAO-style entity pathway with a limited-liability shield. Where no shield exists and enforcement or case law is active (e.g., U.S. federal posture, UK still scoping), member-level risk rises by ~20–30 points under our rubric. EU reforms (AI Act + PLD) raise product/platform exposure regardless of entity form, but they do not, by themselves, pierce a properly maintained entity shield.

METHODOLOGY

This is a doctrinal and comparative analysis supplemented by a transparent, rubric-based scoring exercise:

- Legal sources:** We reviewed primary sources (EU regulations/directives; state/national DAO statutes; U.S. court orders) and authoritative explainers to confirm dates, scope, and posture.
- Role mapping:** We mapped AI-BAO stakeholders to legal roles: AI provider (developer/trainer), deployer (operator integrating AI into the BAO), maintainer (core devs/multisig/oracle), custodian (asset holder), and end-user/member.
- Risk rubric:** We assigned points for presence/absence of DAO statutes and shields, case law/regulator posture, and AI/software product-liability modernization. The Member Liability Risk Score

reflects personal exposure of ordinary participants, not enterprise or product-level exposure.

- Limits:** The scoring is illustrative, not a probabilistic model. It clarifies directional effects of legal features on member exposure; actual risk depends on facts (bylaws, disclosures, KYC/AML posture, governance centralization, operational controls).

RESULTS

1) Entity shields help—but are conditional: Jurisdictions with DAO forms (Wyoming/Tennessee/Utah/Vermont/Marshall Islands) lower member exposure if the organization is formed and operated in compliance (registered agent, compliant articles/bylaws, disclosures, upgradable contracts where required, annual filings). Failure to follow formalities can collapse the shield or prompt courts to impute partnership.

2) Where no shield exists, courts fill the gap: U.S. courts have been willing to treat DAOs as general partnerships (or unincorporated associations), enabling joint and several liability among participants for negligence and statutory breaches; regulators have obtained default judgment, injunctions, and monetary penalties directly against a DAO.

3) EU regimes shift exposure for AI/software harms: The AI Act defines obligations for providers and deployers of AI systems; the PLD (2024/2853) modernizes strict product liability to cover software and AI and contemplates post-sale changes like model updates—critical where an AI agent in a BAO is iteratively improved. These rules raise platform and vendor exposure even when member shields exist.

4) MiCA binds the rails: For AI-BAOs that issue tokens or rely on EU-facing CASPs, MiCA’s phased application standardizes issuer and service-provider duties, indirectly

shaping governance (e.g., custody, market abuse constraints) for on-chain actions triggered by AI agents.

5) AI-specific governance must be embedded: Because liability follows foreseeability and control, operational controls (model documentation, dataset provenance, pre-deployment testing, human-in-the-loop approvals for high-risk actions, fallback/kill switches, audit logging, prompt/library whitelisting, and incident response runbooks) are decisive in showing due care under negligence and regulatory standards.

DISCUSSION

Functional allocation beats labels

An AI-BAO may call itself “decentralized,” yet if a multisig, core team, or foundation configures or meaningfully controls the AI agent (e.g., model weights, policies, or guardrails), those actors look like **providers** or **deployers** for AI Act purposes and like **controllers/maintainers** for tort and consumer law. Entity shields protect members, **not** careless or deceptive practices by controllers or service providers.

Pathways to reduce liability without stifling autonomy:

- **Adopt an entity wrapper** (DAO LLC/LLD/BLLC or equivalent) and keep formalities **current** (registered agent, annual reports, disclosures).
- **Role clarity by design:** In bylaws and interface docs, identify **AI provider/deployer/maintainer** roles, allocate duties (testing, monitoring, rollback authority), and document **approval chains** for high-impact actions.
- **AI assurance dossiers:** Maintain a living evidence pack: data lineage, model cards, evaluation reports, red-team findings, oracle dependencies, and change

logs (to address PLD burdens of proof and AI Act conformity).

- **User-facing transparency:** Risk disclosures to token-holders and end-users; clear terms for recourse, indemnity, and dispute resolution (with jurisdiction/venue clauses mindful of **private international law** uncertainty).
- **Fallbacks and human overrides:** For actions with physical or large financial externalities, require M-of-N human sign-offs or circuit-breakers; log decisions immutably.
- **Insurance and reserves:** Consider D&O-style covers adapted to DAO managers, incident contingency funds, and bug bounty programs.

CONCLUSION

AI-blockchain-enabled autonomous organizations represent a compelling organizational frontier where code, incentives, and machine intelligence converge. The law is catching up—not by creating a vacuum, but by extending familiar doctrines and enacting targeted regimes. The EU AI Act and new PLD set a comprehensive compliance baseline for AI and software; MiCA harmonizes crypto rails. U.S. courts, meanwhile, have shown they will pierce decentralization rhetoric and treat unwrapped DAOs as general partnerships—and regulators can obtain judgments against the DAO itself. Entity statutes (Wyoming, Tennessee, Utah, Vermont, Marshall Islands) meaningfully lower member exposure when used correctly, but they do not immunize providers, deployers, or maintainers of AI-driven systems from liability for defects, misrepresentations, unfair practices, or negligence.

For AI-BAOs, liability follows function and foreseeability: those who design, train, deploy, or materially control AI oracles and smart contracts must own commensurate duties of care. The

practical path forward is neither to abandon autonomy nor to pretend law doesn't apply, but to engineer liability-aware governance—formal wrappers, role-based obligations, auditable AI assurance, and human-in-the-loop controls—so that innovation and accountability can co-exist.

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