

Perspective

From Vision to Strategy: Expanding Metaversal Integrative Healthcare with DAOs and Blockchain Ecosystems

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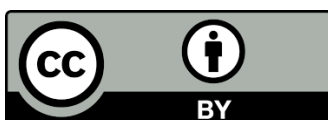
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Abstract

Legacy, profit-driven organizational structures often lack the adaptability, equity, and innovation required for the evolving complexities of contemporary patient-centered care. They can limit access, constrain options, impose financial burdens, and hinder optimized delivery. Here, we propose a new architecture for metaversal integrative healthcare using decentralized autonomous organizations (DAOs). Blockchain technology and smart contracts underpin equitable, transparent, and resilient health ecosystems beyond institutional gatekeeping and entrenched hierarchies. Central to this innovation is the introduction of Ecosystem Value Networks (EVNs), which quantify how diverse contributors, including patients, function as “wellness stewards” within decentralized, interconnected networks of value. EVNs represent a paradigm shift from transactional, top-down authority structures toward relational, emergent, and self-perpetuating interconnected systems. By programming prosocial principles into the architecture of DAOs via governance tokens, digitally encoded collective voting, autonomous smart contract enforcement, and transparency-by-design; these dynamics intrinsically reinforce collaborative over competitive behaviors and outcomes. Traditional institutions often reward dominance, prestige, and hierarchy, that represent conditioned patterns rooted in ancestral scarcity-based modes of fear and control; ill-suited



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for equitable healthcare. DAOs and EVNs, in contrast, condition new modes of operation grounded in abundance, interdependence, and shared stewardship. Over time, these digital frameworks can transform how health knowledge is generated, distributed, and enacted, establishing a “new normal” from the inside out, in which interconnectivity defines leadership and value. Moving from vision to strategy, this work maps a pathway toward truly participatory (opposed to nominal or symbolic), adaptive, and value-responsive healthcare systems for the new digital age.

Keywords

Artificial intelligence/AI; blockchain technology; clinical practice; decentralized autonomous organizations; digital assets; fiscal strategy; integrative healthcare; smart contracts

1. Some Significance, Scope, and Rationale

Building upon the ideas introduced in *Welcoming the “Metaverse” in Integrative and Complementary Medicine* [1], this work advances integrative healthcare by proposing pragmatic architecture for leveraging metaversal technologies and decentralized organizational structures. As such, we move from conceptual exploration to present utility. The initial editorial envisioned incorporating metaversal principles to facilitate transformational shifts in integrative medicine and holistic healthcare (termed here “integrative healthcare”). Albeit, many of the technologies introduced in the original editorial could be perceived as rather a quantum jump from current frameworks in the field, presenting significant challenges regarding justification and implementation. However, developments in ‘metaversal technologies’ (i.e. systems derived from, or extending, principles of the “metaverse”; a networked digital environment integrating virtual and augmented spaces), pertaining to operational structures such as decentralized autonomous organizations/DAOs using blockchain technology, offer real-world solutions that can be cost-effectively applied to advance integrative healthcare delivery and experience.

For integrative healthcare to transition from an adjunctive or alternative treatment pathway into a fully mainstream discipline, it may benefit by following a trajectory similar to pharmacology. The rise of pharmacology as a distinct medical specialty was not incidental; it coincided with expansion in research and clinical service budgets [2]. Pharmacology’s integration into mainstream medicine was driven by strong, multi-site, evidence-based clinical mechanistic trials [3]. A relatively comprehensive understanding of drug mechanisms provided a degree of predictability for clinicians, determining when and why certain treatments worked (or not) within specific patient populations. A comparable level of rigor is needed for integrative healthcare, since without continued robust, multi-site trials [4-9], for a slice overview], the field may remain on the periphery of medicine. Albeit, focus on biomarkers means moving beyond subjective patient-reports and primary efficacy measures, towards more predictive mechanistic frameworks. Presently, integrative healthcare may be suggested as an adjunctive, or something novel, without strong articulation as to rationale or clinical action. The specialty will benefit considerably by demonstrating the biological underpinnings of its treatments, extending into bio-psycho-social frameworks. Continued advancement in biological marker research pertaining to neural, cellular, molecular, metabolic, and/or

immunological outcomes can facilitate the specialty to re-align as part of the medical framework with physiological effects, akin to how pharmacological agents are understood and used.

Another issue is standardization. Across mindfulness-based interventions alone, rather than consolidating well-established programs, scholars/clinicians continue to propose their own unique protocols, which not only saturates the market but also undermines the consistency and comparability of the evidence supporting their effectiveness. This example could be applied to any integrative healthcare modality at present (from acupuncture, bio-/neuro-feedback, hypnosis, tai chi, yoga, and so on) where clearly defined treatment parameters and protocols are generally underdeveloped or inconsistent. Returning to pharmacology, it evolved from a diverse set of folk healing practices originating in small communities, local apothecaries, and traditional healers, into a unified, evidence-based specialty with defined treatment protocols and dosages [2, 3]. It could be reasoned that integrative healthcare is evolutionarily at the early stages of its trajectory, and would significantly benefit from a similar movement toward the standardization of practices that will enhance reliability and applicability. Systemization would not necessarily jeopardize diversity since preserving the breadth of therapeutic choices available to a broad range of complex patient cases is a central tenet of the specialty. Rather, standardization would further support a framework that ensures clinical and research rigor, patient safety, and personalized care, whilst facilitating broader adoption within mainstream medical systems.

The aforementioned challenges are multifaceted and require transformation across a range of domains. Metaversal technologies may facilitate this transformation. The structure of an organization, encompassing its leadership and administrative systems, both practically and semantically, significantly impacts its functionality and effectiveness. This may be a key area for leveraging metaversal tools to help align integrative healthcare more closely with mainstream medicine in offering truly global healthcare accessible for all. Initially, three key areas stand out where metaversal technologies may offer meaningful impact: (1) the integration of decentralized organizational structures (or DAOs) to support democratized governance and processes, promote transparency, and help mitigate bias, administrative inefficiencies, and narrow, profit-driven decision-making. All of which can hinder the progress of the specialty as a whole; (2) leveraging smart contracts and blockchain systems to streamline clinical workflows, optimize fiscal operations, enhance research developments, and ensure equitable and effective resource allocation; and (3) the use of DAO and blockchain data systems that can support the development of standardized treatment protocols and evidence-based frameworks, in turn, improving clinical legitimacy whilst maintaining broad therapeutic scope.

The above points provide direction for the forthcoming sections, that outline new decentralized architecture as a solution (Section 2), introduce the construct of Ecosystem Value Networks (EVNs) towards redefining value (Section 3), detail financial and insurance implications (Sections 4–5), present a technical real-world use case (Section 6), describe relevant legal contexts (Section 7), and conclude with an overall synthesis (Section 8).

2. Welcoming Decentralized Autonomous Organizations (DAOs) within Healthcare Ecosystems

DAOs are relatively new digital infrastructure that enable algorithmically enforced decentralized self-governance via blockchain technology. In essence, DAOs are collectively owned and governed systems in which rules, procedures, and decision-making processes are encoded into smart

contracts, or autonomous self-executing code stored on the blockchain [10]. This allows an organization to democratize access to, and allocation of, resources and equitable participation in processes across an organization [11]. Contrary to traditional healthcare organizations that use 'business models' with a centralized hub of leadership subject to hierarchical structures primarily driven by focus on financial outcomes and profit; DAOs distribute authority across a network of community stakeholders who hold governance rights based on token ownership. Depending on the design, tokens may represent equal votes per participant, weighted votes based on contribution or expertise, or other pluralistic voting models that prevent plutocratic dynamics [12, 13]. Blockchain technology can be both the ledger and enforcement layer for the DAO system. This seamlessly facilitates that the rules and parameters set by the community can be enforced consistently and without human bias, delay, or intervention. For example, treasury management is fully transparent and governed collectively, where community-approved proposals trigger autonomous funding disbursement. Over time, such infrastructures have the potential to recalibrate how decisions are made, who participates, how value is defined, and what norms are reinforced within the overall system. Within a healthcare context, this structure can create a 'wellness network' where every stakeholder (i.e. patient, caregiver, practitioner, researcher, administrator, community member, etc.) is recognized as a 'wellness steward'. We introduce this term, which seems rather apt, since it reflects an entrustment of shared responsibility in shaping and sustaining the overall healthcare ecosystem. However, it is important to emphasize the ethical implication here, that with such a system, the concept of a wellness steward does not shift medical or administrative burdens onto patients and caregivers, rather cultivates equitable participation in shaping healthcare policies, priorities, and resource allocation. This can ensure that decisions and policies are informed from diverse perspectives, ethically sound, with broad long-term (not solely short-term financial) vision.

Figure 1 illustrates the non-hierarchical structure of a decentralized autonomous organization/DAO in integrative healthcare. The network is arranged using a force-directed layout, where nodes represent key components of the DAO, and bidirectional arrows depict interconnections. The central "DAO Structure" node links to three primary pillars: Governance, Funding, and Continuous Adaptation/Improvement, reflecting the system's dynamic and participatory nature. Furthermore, clusters emerge based on function:

- **Governance and Decision-Making (Purple):** This includes voting mechanisms, governance tokens, and proposal submission open to all wellness stewards of the DAO.
- **Funding Mechanisms (Yellow):** Covers grants, crowdfunding, and philanthropic contributions for research, development, and clinical services.
- **Research and Open Science (Teal):** Encompasses research funding, open-access publishing, and peer review processes.
- **Smart Contracts and Financials (Green):** Includes smart contracts, funds allocation, the DAO treasury, and payment automation.
- **Decentralized Clinical Services (Orange):** Represents virtual clinics, consultations, and service-related transactions.



Figure 1 Decentralized Autonomous Organization/DAO Structure for Integrative Healthcare.

One might question: what is the deviation of a DAO from any other traditional democratic process, and why is such a new organizational structure optimal? Primarily, innovation stems from the use of metaversal blockchain technology and smart contracts. Blockchain technology refers to decentralized, distributed ledger architecture that records data entries and transactions across a network of nodes using cryptographic hashing and consensus mechanisms (i.e. Proof-of-Work or Proof-of-Stake) [14, 15]. Each block is chronologically linked to the previous one, which ensures immutability, transparency, and resistance to unauthorized alterations [15]. Smart contracts are autonomous, self-executing code deployed onto blockchains, which automatically enforce and verify the performance of agreed-upon conditions between the community without external intervention [16]. Smart contracts interact natively with blockchain assets and protocols, enabling functionalities like decentralized governance, automated financial transactions, digital identity management, and dynamic resource allocation in DAOs and other blockchain-based systems [17]. With this infrastructural set-up, protections for the entire organization are put in place from disruptions caused by changes in leadership, detrimental decisions based on short-term thinking, organizational shifts, external pressures, potential corruption by harmful ‘actors’, or any outside influence that might attempt to manipulate or alter the terms of the agreement for personal/external (psychological or material) gain. That is, if any entity attempts to alter the DAO's governance structure or financial decisions, they would be unable to change the smart contracts without consensus, and thus extended *real-time awareness*, from the entire DAO's community.

Albeit, DAOs are not entirely rigid or inflexible. Modifications to the governance system and/or smart contracts can still be made through a transparent and democratic process. Any proposed changes can be presented by *any* wellness steward with a clear rationale and supporting evidence (where necessary), that would need to be voted on, ensuring that power remains equitably distributed and that intentions behind changes are transparently conveyed so that decisions to adapt the smart contract/s reflects the collective will and longevity of the community. This process ensures that the organization remains accountable, resilient, and adaptable while preserving its decentralized nature.

Another advantage in using DAO-based smart contracts is that operations are significantly streamlined since they can be executed automatically on the blockchain without the need for intermediaries or extensive administrative layers. The converse is true with many traditional operational systems, including hospitals, medical centers, and universities, where vast amounts of resources are siphoned into executive and administrative roles, that in some cases, can become inefficient or complacent over time, contributing to waste and hindering innovation. Rather than diverting funds toward high executive salaries and large administrative teams, a DAO reinvests its resources back into the system, empowering wellness stewards to make decisions that align with the values of equitable access to all possible healthcare services, sustainability and spread of financial resources, with knock on effects to clinical/research innovation. By eliminating the inefficiencies of top-heavy bureaucracies and redirecting funds away from excessive overhead costs, a DAO infrastructure values all wellness stewards equally, fostering an open culture of collaboration, transparency, and shared responsibility. It also emphasizes accountability by ensuring that decisions that may negatively impact the organization (intentional or otherwise), are subject to collective review prior to any short-sighted action. This transparency helps mitigate harmful workplace dynamics and promote accountability, particularly relevant in medical academia, where hierarchical structures may inadvertently obscure issues that hinder healthy collaboration. This approach inherently aligns with the core principles of integrative healthcare - holism, inclusivity, and patient-centered care - whilst ensuring that every voice contributes to the organization's evolution.

DAO adoption in healthcare remains exploratory. However, some emerging initiatives presently exist that are experimenting with decentralized governance. Table 1 compiles key examples primarily from early stage biotech contexts rather than traditional institutions, summarizing their mission/purpose and development stages. To note, these examples use DAOs to collate existing healthcare businesses into a collaborative of sorts, and thus, differ from the proposal here (outlined further in Section 3) where we suggest companies/organizations themselves can be set up/re-structured using DAO-based architecture. Nevertheless, the table below provides a useful illustration of the unfolding, but applied potential, of DAOs in various healthcare contexts.

Table 1 Emerging healthcare-related DAOs and their current status (September 2025).

DAO Name	Challenge/Problem Addressed	Main Purpose Cited from Website/Whitepaper	Current Status (2025)
BioDAO www.biodao.xyz https://www.bio.xyz/	Gaps in early-stage biotech funding; traditional investment favors large institutions.	“Our mission is to create a global democratic biotech ecosystem focused on identifying, funding, and supporting real-world biotech projects to accelerate innovation and solve pressing challenges.”	<i>Emerging.</i> Recently integrated into the broader Bio Protocol ecosystem, as a BioAgent Launchpad and liquidity engine.
CureDAO curedao.org	Lack of actionable insight into how foods, drugs, and lifestyle factors affect health outcomes.	“CureDAO is creating an open-source platform to discover how millions of factors like foods, drugs, and supplements affect human health. We’re on a mission to democratize clinical research.”	<i>Active.</i> Platform live with user engagement and research activities.
GenomesDAO dao.genomes.io https://www.genomes.io/	Genomic data is siloed, lacks sovereignty and privacy protections.	“In order to increase the democratization and decentralization of genomic studies, we focus on combining cutting-edge technologies such as AMD’s SEV, blockchain, and decentralized finance.”	<i>Active.</i> Secured investment (2024–25) and advancing pilot projects in genomic data storage and sharing.
VitaDAO vitadao.com	Biopharma R&D depends heavily on IP and patents, creating inefficiencies and access barriers.	“VitaDAO is a DAO collective for community-governed and decentralized drug development. Our core mission is the acceleration of research and development (R&D) in the longevity space and the extension of human life and healthspan. VitaLabs is VitaDAO’s in-house network of interdisciplinary scientists dedicated to pioneering cutting-edge longevity science. Our mission is to radically extend human healthspan and lifespan by developing cutting-edge research while empowering democratic ownership of intellectual property through Intellectual Property Tokens.”	<i>Active.</i> Most established healthcare DAO; launched biotech spinoffs and governance token initiatives.

3. Why a DAO Redefines “Value” within Healthcare Contexts

In traditional medicine systems, roles are often valued on hierarchical status, financial revenue generation, and/or individual visibility. These metrics can obscure measurements of systemic worth, such as other roles that are equally valuable to the operation and success of the system as a whole. For example, the medical doctor/MD is typically positioned as a central authority because of their direct patient interface. Although, their input and care are sustained by a broader network of researchers, administrators, coordinators, and other professionals. And ultimately, without the patient, a doctor would not exist. However, because the financial transaction in patient care typically occurs at the level of the MD, they are often perceived as the primary revenue generators and, by extension, one of the most “valuable” contributors within the system. This may also inadvertently reinforce political dynamics that privilege outward-facing behaviors, implicit bias, and nepotistic favoritism over deeper meritocratic evidence-based assessments of competence. Individuals skilled in convincing and navigating interpersonal optics or perform well in advancement-oriented contexts may garner impactful roles within the organization without having the necessary skills, experience, or professional integrity. This may not stem from intentional exclusion, but it does reflect a political economy that rewards social capital over systemic contribution. Over time, such dynamics can harm organizational ethics/integrity via a structural design that fails to align superficial optics with actual impact. In contrast, a DAO-driven healthcare ecosystem offers a transformative paradigm where the concept of value within an organizational structure aligns more closely with principles found in general and adaptive systems theory, and aspects of Buddhist philosophy. What links these theoretical frameworks with a DAO is the concept of “interconnectedness”, where the value of each role emerges from its relation to the whole.

3.1 DAO Value Through the Lenses of Systems Theories and Interconnectedness

At the core of these theories, value is not an isolated, static measure but a dynamic concept shaped by the relationships and interdependencies within any given system. For example, General Systems Theory/GST [18-20] maps out interconnectedness of all components within a system, highlights that every part of a system contributes to the whole, and that each component's value is defined by its role within the network. This resonates with the principles of Complex Adaptive Systems/CAS [21, 22], which describe the evolution of a system through the dynamics (quantity and quality) between the system's components. In Complex Adaptive Systems/CAS, no single component can be viewed in isolation since value emerges through the system's ability to adapt, learn, and grow collectively, as a result of the continuous interaction (or lack thereof) between all roles within the system. A DAO's decentralized framework inherently embodies these principles where value is recognized as a fluid, collective property emerging from the interrelationships among all roles, rather than being concentrated in one domain, such as leadership as one example. The system adapts and reshapes itself based on the inputs from all its wellness stewards, creating an open self-regulating ecosystem. In this context, “contribution” refers to any action, product (tangible or intellectual), resource, or interaction that positively influences the functionality and wellbeing of the system as a whole. Contributions can be both direct and indirect. Direct contributions are those that immediately impact patient care, such as providing medical treatment, conducting research (in some cases impact may not be immediately apparent), or managing patient

data. Indirect contributions, on the other hand, may involve administrative support, logistical coordination, policy development, knowledge sharing and research dissemination. A janitor contributes value by keeping the working environment for all wellness stewards operational, clean, and safe, increasing quality of life, and thus wellness of the system. Thus, value is not derived from role type/title, but through its enactment to enhance 'wellness' (broadly defined) of the organization. In a DAO-based healthcare ecosystem, contributions can be evaluated for their immediate, tangible results, but also for their role in strengthening the system's adaptability and resilience over a longer term trajectory. One metric of value is therefore determined by relational impact, whether concrete or abstract, such as the facilitation in exchange of information, advancing knowledge base, idea creation, enhancing system efficiency, optimizing resource allocation, supporting wellness stewards, and/or strengthening connections between roles, that promotes the overall wellness of the ecosystem. In turn, clinician-patient interactions that generate (immediate) revenue are one part of this bigger picture. A useful tool in systems theory is graph analysis [23, 24] which may visualize this process via an organization as a network where "nodes" of the network represent the individual components (i.e. the range of wellness stewards), and "edges" (or connections) represent the relationships between these nodes. AI-based tools can further map and visualize these connections, helping all wellness stewards see their own role (node), and how they contribute to the larger network (edges). This approach to perceiving an organization emphasizes the collective value of each node in the network, creating a more structurally inclusive and politically transparent system of valuation that aligns more closely with the lived realities of healthcare, collaboration, and organizational health.

These contemporary network models link to more ancient insights outlined in Buddhist philosophy, particularly the concept of interdependent origination (*pratītyasamutpāda*), where everything exists in relation to everything else [25-27]. Applied to healthcare ecosystems, this view suggests that no role holds intrinsic value on its own (i.e. the 'without a patient, a doctor would not exist' mantra). A role's worth is co-constructed through its connectivity to the system's wellness. This logic aligns with the structural principles of a DAO, where hierarchical status is replaced by decentralized participation. True value emerges not from authority or prestige, but from a role's capacity to enrich the ecosystem, through both the quantity and quality of its interconnections and associated activities. For example, a medical doctor/MD may present as a caring professional in clinical settings but operate in ways (interpersonally or institutionally) that fail to support a culture of mutual respect or collaborative care. Such behavior may not breach clinical standards per se, but does erode trust and weakens the fabric of interconnection essential to a healthy care ecosystem for all. These misalignments highlight that, from a systems perspective, value arises from consistent/sustained contributions to the ethical, relational, and functional health of the whole, rather than relying on professional title or surface behaviors.

A DAO's architecture and metaversal extensions embody this deeper systems logic. Value is understood as co-created impact, not extracted gain. Return on investment expands to include social good, educational growth, knowledge expansion, collaborative innovation, and overall systemic health. When we design organizational structures around connectivity, collaboration, and collective intelligence, a new form of value emerges that is rooted in relational contribution. In such DAO-based systems, zero-sum perspectives dissolve. Competition and sabotage are not just professionally unethical, they are systemically incompatible and evolutionarily outdated. What uplifts one, uplifts the whole. What degrades one, weakens the entire network, even when this is

not instantaneously apparent. Thus, integrity, cooperation, and mutual empowerment are not merely guiding system values, but structural necessities for the DAO's survival/resilience and flourishing, breeding a new evolution in organizational existence/activity.

3.2 Introducing Ecosystem Value Networks (EVNs) within Integrative Healthcare DAOs

Whilst these ideas may seem overly philosophical, potentially even idealistic, they hold pragmatic value when applied using metaversal technologies. Contemporary approaches to valuing networks often rely on quantitative formulas derived from economic or technological models, for which a few presently exist. For example, Metcalfe's Law [28] posits that a network's value grows proportionally to the square of its users, emphasizing scale over quality (the "we are too big to fail" thinking). Reed's Law [29] builds upon this model by proposing that exponential value growth is based on subgroup formation potential, and in doing so, highlights the power of communities. However, not all communities are productive or meaningful, and so this model can overinflate value, where potentially there may be none. In contrast, Beckstrom's Law [30] quantifies value by the net benefit to each user, emphasizing individual utility, but this can be difficult to ascertain without transparent objective metrics. Odlyzko's [31] modified models of Metcalfe's Law account for diminishing returns as networks expand, but still fail to take in account the quality of relational dynamics within a network that can increase its strength. A less frequently named but often implicitly followed pattern in traditional systems, particularly in healthcare, resembles Zipf's Law [32], which is a rank-based model where a small number of nodes (such as executives or specialists) accrue the majority of value, influence, and financial return, while the majority of participants, such as patients, nurses, general practitioners, building management, support staff, etc, receive progressively less. Such distribution may be efficient or even desirable in certain profit-maximizing business environments, but is poorly suited to healthcare, where relationality, equity, and systemic interdependence are foundational. This hierarchical and static structure reflects a deeply unequal value distribution. Whilst these models are advantageous in some industries, they overlook the qualitative, context-sensitive, and relational dynamics crucial in human ecosystems like healthcare.

Here, we build upon prior concepts of organizational value and interconnectedness by proposing the construct of Ecosystem Value Networks (EVNs). EVNs offer an evolved perspective, prioritizing real-time contribution, interconnectivity, and dynamic contextual relevance over fixed metrics of volume or economic exchange alone to value the overall network. This provides a novel framework for value attribution within DAO-based structures because such a construct emphasizes the systemic and interdependent nature of human-centered healthcare ecosystems. Within such a decentralized structure, the DAO functions as a dynamic open system and EVNs represent the semantic mesh, providing cohesion and meaning to the flow of contributions, embodying relational intelligence, organic growth, and collective wellbeing. This architecture shifts the paradigm away from traditional transactional metrics, hierarchical status, and subjective human bias.

Figure 2 illustrates the interconnected roles (i.e. *Wellness Stewards*) within a decentralized healthcare or academic ecosystem governed by a DAO. Unlike traditional hierarchies where roles maintain fixed levels of authority or importance, the EVN represents a *fluid and adaptive system* where the relevance of each role dynamically shifts based on situational demands. Node color intensity reflects contextual relevance since roles may become more central during certain processes (e.g., researchers during idea/strategy creation, clinicians during acute care, maintenance

during infrastructure crises), but these dynamics are ever-shifting across time. Connection line thickness denotes the intensity of relational engagement between roles. Here, no single role holds static precedence. Rather, collective organizational wellness emerges from equitable, reciprocal interdependence across all wellness stewards. EVNs can further leverage metaversal technologies and AI to track/visualize real-time contributions/activity and direct/indirect connectivity across the network, so that value emerges through traceable dynamics, blockchain smart contracts, and community consensus, opposed to a top-down metric. Importantly, the structure is non-hierarchical, since node position does not imply status or authority. For example, a guidance role on the periphery may glow brightly, denoting high value through peer support and lived experience, even if their role is traditionally undervalued as an end-point revenue-generator in institutional settings.

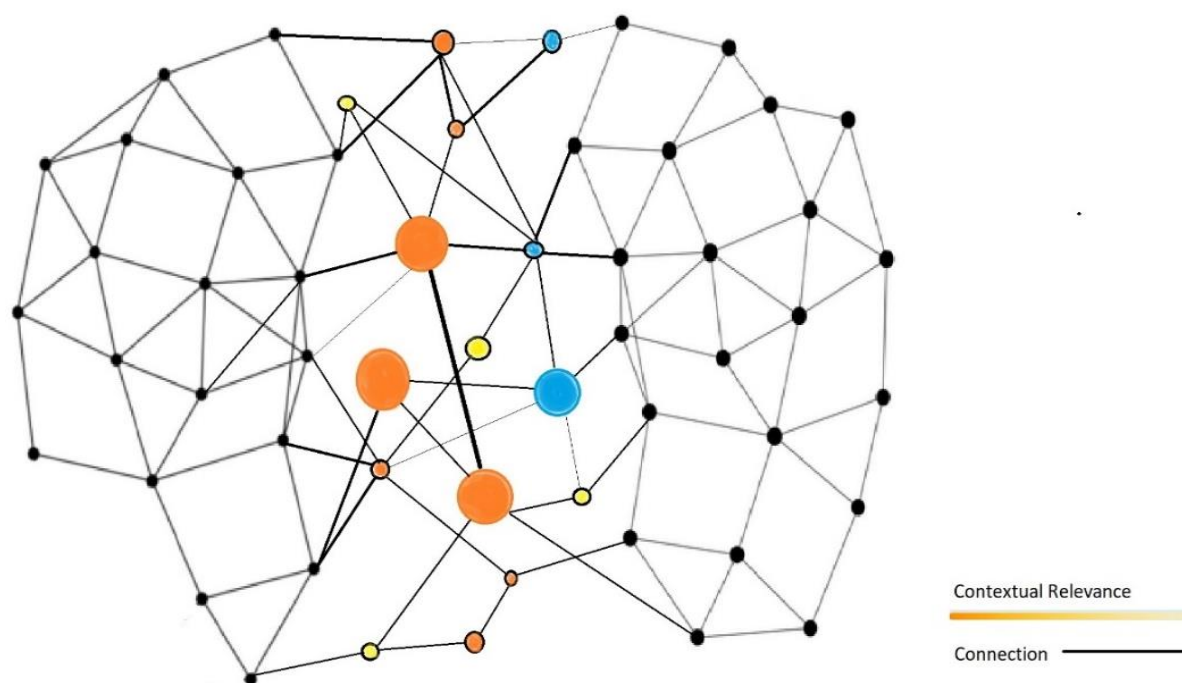


Figure 2 Ecosystem Value Network (EVN) visualization within a DAO. * *Node color intensity reflects contextual relevance since roles may become more central during certain processes (e.g., researchers during idea/strategy creation, clinicians during acute care, maintenance during infrastructure needs), but these dynamics are ever-shifting across time. Connection line thickness denotes the intensity of relational engagement between roles (nodes).*

Thus, EVNs account for real-time contextual relevance and systemic contribution over time. That is, value is based on multi-dimensional inputs such as emotional labor, expertise, idea creation, interdependence, strategy, patient-engagement and/or co-creation, peer mentorship, and so on. This aims to correct for the historic undervaluation of certain roles (e.g. caregiving, lived experience, patient participation) that are critical to human healthcare but are not necessarily accounted for in traditional network valuation models (see Table 2 for an overview). As such, EVNs shift the emphasis from quantity to contextualized quality, valuing not simply the existence of a connection but its systemic contribution at any given time. This weighted approach is appropriate for healthcare, where a connection say between a patient and nursing staff may carry more weight in a given moment than one between two executives.

Table 2 Present Network Valuation Models vs. Ecosystem Value Networks (EVNs).

Concept	Basic Principle	How Value Is Measured	Limitations	EVN Advantages/Benefits
Sarnoff's Law [33]	Value grows linearly with audience size	Value $\propto n$ (number of viewers/listeners)	Assumes passive users; neglects interaction or contribution	EVNs emphasize reciprocal engagement and contribution, not just audience size
Metcalf's Law [28]	Value grows with number of possible connections	Value $\propto n^2$ (number of users squared)	Assumes all connections are equal in value	EVNs focus on the <i>quality</i> and context of interactions, not just the number
Reed's Law [29]	Value grows exponentially with subgroup formation	Value $\propto 2^n - n - 1$	Overestimates value; assumes all groupings are equally beneficial	EVNs account for group value only when it's contextually meaningful and impactful
Beckstrom's Law [30]	Network value = sum of net individual benefits	Total of all personal value gains from network use	Difficult to measure benefits accurately; overlooks collective/systemic value	EVNs incorporate individual and systemic/ecosystem value, particularly emergence
Zipf's Law [32]	Rank-based distribution of value: few hold most value	Value $\propto 1/\text{rank}$	Reinforces inequity; favors incumbents	EVNs redistribute value dynamically based on real-time, situational relevance
Odlyzko's Modified Law [31]	Adjusted Metcalfe: value increases with diminishing returns in large networks	Value $\propto n \cdot \log(n)$	More realistic than Metcalfe's but still overvalues scale over relational nuance	EVNs emphasize dynamic interdependence and responsiveness over static size scaling
EVN Law	Value is fluid, adaptive, relational, emergent, and context-dependent	Based on real-time contribution, influence, interconnection, and adaptive roles	Still developing methodologies; harder to quantify for traditional economists	Proposes a non-linear model of value rooted in dynamic systems theory, equity, and connectivity

In sum, EVNs operate as an adaptive, transparent system for recognizing and attributing value across diverse forms of contribution, expanding beyond conventional metrics like billing, publications, or titles. It emphasizes interconnectivity, emergence, and abundance, supporting a shift from sheer quantity, individual prestige, and/or competition (evolutionarily archaic transactional-hierarchical systems), to collective wellbeing (evolutionarily developed abundance-expansiveness-connectivity systems). EVNs can further be delineated from traditional co-operatives (“co-ops”), which typically rely on fixed membership structures, democratic voting, and periodic assessments of contribution [34]. The reason being EVNs operate within a decentralized autonomous (DAO) framework that enables fluid governance and continuous recalibration of value. Whilst co-ops emphasize equality and shared ownership, they often lack the structural capacity to account for the nuanced, moment-to-moment contributions that drive human-centered ecosystems like healthcare. Furthermore, EVNs leverage a combination of blockchain smart contracts, semantic logic, and AI as systems develop, so to visualize, measure, and attribute value efficiently in real-time. This triadic architecture based on (i) DAO infrastructure, (ii) EVN valuation and semantic mesh, and (iii) intelligent metaversal tooling, enables an adaptive system where value emerges through dynamic interdependence rather than static roles or voting tallies. This also delineates a DAO from holacracy, because although both aim to decentralize authority and enable adaptive governance, DAOs typically rely on technological infrastructure and token-based coordination, whereas holacracy is a structured operating system for role-based self-management that is not overseen by technology [35]. Therefore, with such technological architecture, systemic abundance and interconnectivity are emphasized over transactional dominance, inviting a more holistic and equitable paradigm of organizational value needed for human-centered healthcare systems.

3.3 Monetary Profits as Emergent Properties

In this DAO-based healthcare framework underpinned by EVNs, monetary profits do not represent static targets or central motivators. Rather, they arise organically as emergent properties, or non-linear outcomes, that result from the complex interconnectivity among diverse wellness stewards (i.e. dynamism). Each wellness steward generates direct and indirect value that when viewed holistically, contributes to tangible and intangible ecosystem growth. These emergent financial outcomes are not foreseeable by examining any one input in isolation. Instead, they represent a system-level surplus that reflects collective wellbeing, shared purpose/vision, and synergistic interlinkage. This creates a financial ecosystem where monetary value is not the sole determinant of profit-making activity but one that also includes broader ecosystem health and longevity. Here, profits are distributed based on consideration of the progress of the ecosystem, not individual gain. Such a framework creates a self-regulating financial model, akin to a dynamic open system, one in which value is generated, reinvested, and shared in ways that sustain and enrich the entire community. Ultimately, this emergent approach cultivates a collaborative and regenerative non-linear financial system, which is flexible to ongoing demands, yet grounded in holism, shared responsibility, and expanded prosperity.

4. Fiscal Operations: Hybrid Framework for DAO-Based Compensation in Integrative Healthcare

The pragmatically inclined will naturally ask: how can EVNs and the fiscal philosophy of a DAO work on the ground? And for tangible applied change, this is a central question. Partly it requires proposing how to structure the DAO's financial system. Previously, we mentioned the notion of conceptualizing value as a construct of "interconnectivity" rather than allocating sole importance on profits to define organizational progress. Thus, monetary exchange becomes one possible emergent property of the overall network, where value is redefined as relational and participatory, not as static or role-specific. To operationalize this, we propose a points-based system (translated from EVN quantification of value) where all participants/wellness stewards can earn points through their contributions to the ecosystem. These contributions may include clinical care, research collaboration, mentorship, administrative coordination, or even the act of receiving care itself. Importantly, patients are not passive recipients in this framework, nor end-points for revenue generation. Their presence, engagement, and health data participation are foundational to the entire ecosystem. Without patients, healthcare systems cannot function, and so their role is recognized and supported accordingly.

Points accumulated by each wellness steward reflect their dynamic involvement in the ecosystem. These points can be converted into tokenized assets on the blockchain, i.e. digital representations of value that can be exchanged or used within decentralized finance (DeFi) platforms [36, 37]. For example, because blockchain tokens are interoperable, stewards may choose to stake tokens (akin to dividend payments), exchange them for stablecoins (low volatile digital assets), or invest them in other mission-aligned ventures within the ecosystem [38]. This introduces the concept of long-term participatory investment in healthcare, where one's involvement becomes both a source of personal wellness, in addition to collective wealth. For roles that require traditional compensation such as clinicians, researchers, maintenance, etc.; a hybrid payment model can be used. A portion of compensation is disbursed in fiat currency (e.g., CHF, EUR, GBP, KWD, USD) to address immediate financial responsibilities. The remaining portion is allocated as blockchain tokenized assets that can be: (1) converted to fiat on demand, (2) retained as long-term digital holdings, (3) utilized for participatory governance functions, or (4) reinvested into the ecosystem to support sustainability and growth. This framework is intentionally designed to be accessible and malleable. The extrinsic motivator of points is a familiar, gamified starting structure. However, this provides a foundation for a flexible system that can evolve over time towards more advanced forms of dynamic value attribution (i.e. AI or algorithmic feedback loops) to recognize nuanced contributions beyond human metrics as resistance to integrating blockchain technology diminishes and trust enhances.

The combination of fiat and digitized compensation creates a balanced and flexible financial model that aligns with the values of decentralization and transparency. By using blockchain technology and decentralized principles, a hybrid financial system enables a more equitable distribution of resources and opportunities, creating a collaborative environment where all wellness stewards may be empowered and invested in the growth of the organization as a whole. This is because the DAO tokenized financial structure functions similarly to equity in traditional corporate settings. Just as equity grants employees a stake in the company's success, DAO tokenomics provide wellness stewards with a share in governance, profit-sharing, and decision-making. However, unlike traditional companies, where equity is typically concentrated among executives or shareholders,

the DAO model allows for a decentralized, distributed ownership that empowers all members/wellness stewards, not only the executive branch. A knock on effect is the facilitation of greater security for the entire ecosystem, opposed to a concentrated few, who may claim themselves to be “indispensable” (i.e. hierarchy over other roles). To ensure the financial sustainability and practical application of a DAO within the context of healthcare, other aspects of blockchain technology such as decentralized finance (DeFi) mechanisms, including liquidity pools, staking, and tokenized governance models, can be used to create alternative financial structures [39, 40] that support passive income streams for all, in turn, facilitating the growth and sustainability of the organization. Liquidity pools allow participants to deposit tokenized assets into shared smart contracts that enable decentralized exchanges and lending, where token holders receive a share of transaction fees and yield [41]. Staking mechanisms permit participants to lock their tokens into the system for predefined periods in exchange for staking rewards [39, 42]. These mechanisms provide a foundation for the DAO’s operations and also incentivize engagement in governance, ensuring that funding pools remain full for distribution across all wellness stewards, rather than focus on distribution amongst narrow areas of leadership and administration.

Importantly, this system does not rely on the introduction of new external capital or speculative investment to function. Revenue is generated through existing and familiar healthcare income streams, such as clinical services, digital wellness programs, and educational offerings. Income is then redistributed through different, community-governed architectures. The paradigm shift is not in how income is generated but in how it is shared, removing the traditional upward funneling of resources toward executive or shareholder profit. Notably, this shift is immediately actionable through present blockchain technology and AI systems (for further technical details, see Section 6). However, it is important to emphasize that while this framework promotes collective ownership and dismantles extractive hierarchies, it does not endorse flat or equal distribution by default. The aim is not to blindly level all outcomes, but to re-strategize compensation outputs that align with meaningful contribution, interconnection, and sustained effort, rather than title, status, or institutional privilege. To prevent manipulation or inflation of contributions for disproportionate compensation, all activity may be managed by an immutable blockchain ledger and monitored by AI systems programmed to detect anomalies/verify input legitimacy. AI protocols can flag suspicious patterns, cross-validate claims, and ensure that point allocations correspond to genuine, system-recognized contributions, discouraging attempts to ‘game the system’ for points.

Furthermore, additional technologies, such as virtual spaces within the metaverse, can be leveraged as virtual clinics, wellness hubs, research centers, and educational programs to generate revenue through service fees or leasing digital real estate. These funding streams are already used in fiat-based healthcare systems, but differ here because all assets generated within the DAO ecosystem, including virtual property and digital revenue, are collectively owned by the community. This ensures that financial flows remain and keep value within the network rather than being siphoned into executive salaries, overheads, or shareholder profits. For example, whilst healthcare institutions generate vast amounts of profit today, even under the tax-exempt status of a “non-profit”, much of the research endeavors and innovation remain funded by philanthropy. These same institutions, despite generating considerable profits, continue to solicit donations for their infrastructure, research, and clinical operations, all while compensating their executive branches with higher six-figure to seven-figure salaries (in some cases approaching eight), even as wages for most staff remain flat or fall behind inflation [43, 44]. Naturally many donors genuinely care about

the causes they support and may view the tax deduction as a secondary benefit in the management of their own finances. However, the broader financial contradiction between nonprofit status, substantial profit generation, and ongoing philanthropic reliance may still warrant scrutiny. It is also important to note that traditional executive structures, including titles such as CEO, are often misaligned with healthcare purposes. Unlike business CEOs, who assume significant personal and financial risk in founding and growing a company, hospital CEOs typically occupy senior management positions without comparable entrepreneurial stakes. This dynamic can foster risk-averse decision-making, slower innovation, and the pursuit of hierarchical prestige rather than effective organizational leadership. DAO-based governance, by contrast, distributes authority across the community, prioritizing health outcomes, collective oversight, and reinvestment in patient care and innovation, rather than individual titles.

Further revenue streams involving play-to-earn health games, where users engage in wellness challenges, fitness activities, or mindfulness/meditation exercises to earn digital assets that can be redeemed within the DAO ecosystem could be another viable option [45]. An additional economic strategy may involve the creation of virtual dispensaries offering integrative health products, such as supplements, herbal remedies, or wellness tools, with sales contributing directly to the DAO's operational funding under the entire DAO governance structure [46]. The DAO could also establish accredited online courses and training programs for healthcare professionals and laypersons, generating revenue while advancing education in integrative health. Furthermore, interoperability with other DAOs and decentralized finance/DeFi platforms could provide additional financial resilience [47]. Cross-DAO collaborations in healthcare, research, and wellness initiatives would enable shared funding pools and joint ventures, while integration with DeFi protocols could facilitate yield farming, liquidity provision, and decentralized lending to generate passive income long-term.

By leveraging all these potential metaversal tools, an integrative healthcare DAO can move beyond reliance on traditional funding mechanisms held under sole corporate power, towards sustainability and longevity of the whole under equitable decentralized governance. This approach resonates with shifting societal values for healthcare, and not only reinforces the DAO's economic viability but also aligns with the broader vision of advancing healthcare towards a framework that seamlessly facilitates accessibility and innovation where core assets are held by all stewards of the DAO and reinvested into DAO-centric activities and priorities. Somewhere along the line, healthcare became entangled in business-driven models whose values diverged from care itself, ultimately decoupling it from its central purpose. As one possible solution for change, this hybrid system in the first instance coalesces the security of traditional payment models (that are presently used and thus understandable) with the flexibility and equity offered by blockchain technologies (as understanding, trust, and adoption, unfold over time), ensuring that financial sustainability and community-driven decision-making are at the heart of DAO-based integrative healthcare into the new digital age.

5. Redirecting the “Middle-Person”: New DAO-Based Insurance Models for Integrative Healthcare

In building a self-sustaining economic model rooted in collective value generation and reinvestment, the logical next step is to address one of the most entrenched financial bottlenecks in healthcare systems worldwide: the insurance industry. Health insurance models represent another key area of healthcare that could significantly benefit from being re-strategized within a

DAO structure. Returning to the pharmacology example presented during the introduction, it is apparent that while pharmacology advanced scientifically by clarifying mechanistic actions, businesses quickly recognized opportunities for profit; some might even call it “greed” [48, 49]. The original concept of the insurance industry was based in the values of mutual aid and financial protection, where its existence was justified as a custodian of collective health risk, able to pool resources to protect individuals from significant financial harm. However, as the industry became increasingly corporatized, especially in countries like the USA, and as healthcare became more complex and expensive, the insurance industry essentially positioned itself as ‘gatekeepers’, opposed to custodians. Total power was then consolidated by controlling capital, data, and access to services and treatments, enabling the industry to set pricing/reimbursement values, and thus inserting themselves as “necessary” intermediaries [50, 51]. This has ultimately enabled the prioritization of corporate profits over wellbeing, creating a bottleneck where resources are funneled into overheads and shareholder dividends, rather than reinvesting in actual patient care.

No institution is permanent nor untouchable when the foundation of trust breaks down, and public trust in the insurance industry is increasingly in question. Many are growing disenchanted with a traditional business-model system that prioritizes corporate profit over individual (and thus societal) well-being; what some call a ‘sick-model’ over ‘care-model’ of healthcare. To be clear, this is not an indictment or vilification of business and profit-making in principle, or the cultivation of “us vs. them” mentality; such systems have legitimate value and purpose. However, when applied to the context of healthcare, especially in the most critical and vulnerable moments of people’s lives, these models can reasonably be seen as fundamentally misplaced. It is clear that the populous want peaceful transformative change with regards to an insurance model that has long been perceived as exploiting vulnerable populations for financial gain. The very strength of the insurance industry in its role as an intermediary with centralized control and influence, is also its core vulnerability in the face of emerging technologies. As decentralized systems evolve, the necessity and role of such intermediaries is undergoing fundamental re-evaluation across multiple domains.

Independent from this, the present health insurance landscape does not fully accommodate integrative healthcare offerings, since many treatments are labelled “complementary” or “alternative” and are not eligible for coverage under many traditional insurance policies. This obstructs access for patients currently seeking these therapies, and further hinders the broader systemic expansion of integrative healthcare by limiting its uptake among underserved populations and potential new adopters. Without pragmatic health insurance framework reform, these structural exclusions exacerbate inequities in access and slow innovation with regards to patient-centered holistic care. To scale integrative healthcare to the level of conventional pharmacology, transformation is needed in insurance policy and infrastructure, in addition to re-strategizing the underlying organizational and semantic frameworks that define what counts as legitimate care.

As one possible solution, DAOs can facilitate direct peer-to-peer healthcare funding models where people contribute to a community pool or a health savings fund, and decisions about care are made collectively. In the present framework, contributions for a healthcare fund are controlled by insurance companies who factor in considerable (often hidden) costs to account for their profit margins and administrative overheads. In DAO-based frameworks, these contributions would be considerably reduced for the healthcare receiver, since once set-up, a DAO operates autonomously through smart contracts which do not require salaries and other financial compensation to function indefinitely. Unlike traditional insurer models with fixed premiums, DAO-based healthcare systems

can implement flexible contribution tiers, where individuals pay based on their financial capacity. These parameters can be determined collectively through DAO governance on the blockchain that significantly streamlines the consensus process compared to traditional voting. To safeguard against fraudulent activity especially within flexible, needs-based contribution systems as proposed, blockchain ledgers can be combined with AI algorithms that can flag inconsistencies, verify claims against decentralized data sources, and maintain transparent audit trails without compromising individual privacy. Again, this can all be efficiently implemented without the need for expenditure on large salaried administrative and/or executive teams. This dynamic model fosters inclusivity, reduces financial barriers, and pragmatically aligns with the broader vision of equitable access of care for all. The very structure of a DAO, and implementation of blockchain smart contracts, inherently reduces (or even in some cases eliminates) the need for traditional insurance intermediaries. When using blockchain technology, the insurance industry becomes a collaborative option, opposed to a gatekeeping necessity. In this model, insurers remain relevant by repositioning themselves as collaborators within the ecosystem rather than gatekeepers of access, and can add value through offering their expertise in advanced risk modeling or reinsurance, as examples. Within a DAO, community funds are directly pooled and allocated by smart contracts to actual healthcare need for the entire community/DAO, thereby functioning as a collective, self-governed insurance system. As discussed in the previous section on EVNs, smart contracts can be used within any system and within this insurance context, are designed to handle claims and governance preventing third-party profit-driven insurers from siphoning resources; an approach that empowers patients and healthcare providers to make decisions without interference from corporate interests. New models might help achieve economic sustainability by bypassing traditional insurance companies. Because many integrative healthcare programs are not fully covered by traditional insurance, there would be minimal resistance to incorporating a DAO-based insurance model into integrative healthcare systems as it presently stands.

Overhauling the insurance infrastructure through decentralization would go hand in hand with the broader transformation of healthcare delivery. To ensure system effectiveness, key DAO principles such as decentralized governance, smart contract-driven claims processing, dynamic risk pooling, and tokenized financial incentives, can be applied. Smart contracts would automate and simplify claims processing, ensuring that funds are distributed based on predefined criteria, without the delays and opacity inherent in traditional insurance systems. Moreover, smart contracts can be explicitly coded to prevent profit-driven entities, such as traditional insurance companies, from gaining governance power or financial control within the DAO, i.e. safeguarding from history repeating itself. The transparency and immutability of blockchain protocols offer structural resistance to third-party takeovers or covert manipulation, ensuring that the DAO remains committed to its original mission of reinvesting in patient care, not corporate profit. Risk pooling, calculated by blockchain technology, could dynamically adjust based on community health metrics, enabling more equitable resource allocation and reducing the risk of financial exploitation by corporate entities. This paradigm shift would enable patients, practitioners, and researchers to have a direct role in shaping policy and governing the flow of financial capital. Furthermore, integrating metaversal technologies, such as virtual health ecosystems and digital therapeutics, would provide additional pathways for sustainability. Revenue generated from community-driven initiatives, such as virtual wellness centers or blockchain-based health services, could be reinvested into subsidizing care, lowering costs for members, and supporting research and development innovation. These

metaversal initiatives offer a scalable way to engage with broader communities, expanding access to integrative healthcare services, and ensure equitable distribution of resources for all.

Reasonably, the success of integrative healthcare's expansion into mainstream medicine hinges on systemic change. As long as traditional insurance structures dictate reimbursement policies and funding priorities, integrative and preventative approaches will remain marginalized. By restructuring insurance through DAO-governed models, integrative healthcare can ultimately be free from these financial constraints, achieving equitable growth and sustainable impact. The shift thus happens through the pragmatism of technological efficiency, since when the ecosystem works better for patients and providers, the legacy structures will naturally need to reconfigure around it.

6. DAO Technical Structure and Simulated Use Case in Integrative Healthcare

To clarify how all the aforementioned components may operate in practice, the following section outlines the technical structure of a healthcare DAO and simulates a use case. As previously discussed, a DAO in integrative healthcare is not a fixed hierarchy but a dynamic, self-organizing network whose structure emerges from encoded governance rules and community participation. Blockchain and smart contracts provide the technical framing, as follows:

- **Governance Layer:** Token-based voting, proposal mechanisms, and transparent rule updates.
- **Financial Layer:** DAO treasury, automated fund allocation, and milestone-based disbursements. Figure 3 below illustrates how users/members (for which we term as wellness stewards) interact with the DAO protocol, how the treasury manages funds, and how governance tokens are minted and distributed.

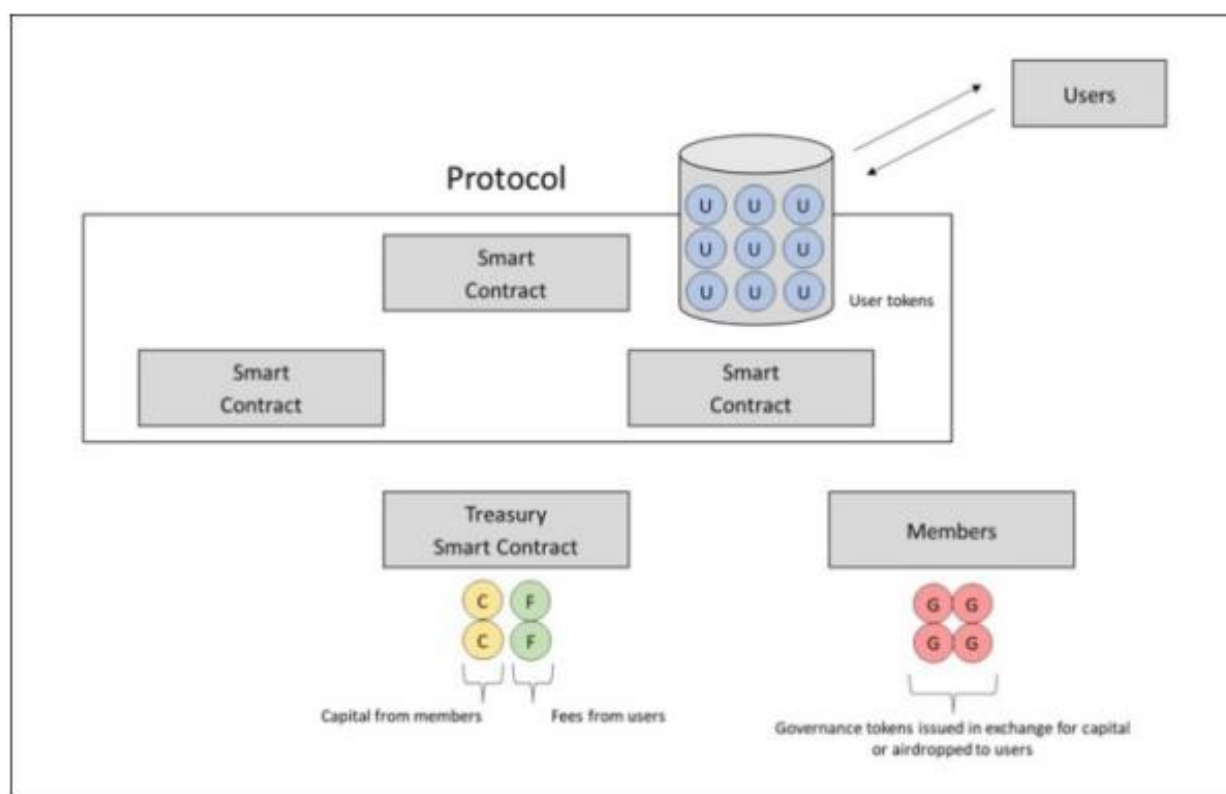


Figure 3 Depicts the typical financial structure of a DAO, specifically how users interact with the protocol and how the DAO is funded by its treasury and owned by its members.

Governance tokens are originally minted by a smart contract of the DAO protocol and then distributed to members. N.B. our proposal also suggests that “users” can transition into “members” with governance membership and rights; essentially creating a wider classification of “wellness stewards”, who may have differentiated roles within the DAO, but remain unified. Any governance tokens minted but not yet distributed are kept in the treasury of the DAO. *Reprinted with permission [52].*

- **Clinical Layer:** Secure patient records, integrative service delivery, and outcome-linked compensation.
- **Research Layer:** Open science proposals, funding approvals, collaborative opportunities, data-banks/repositories, and reproducibility incentives.
- **Leadership and Coordination:** Administrative leadership roles (rotating or elected) that facilitate collaboration and uphold integrity, without concentrating decision-making power.
- **Adaptation Layer:** Continuous feedback and AI-enabled monitoring to optimize ecosystem health and resource flows.

Across all these layers, smart contracts encode and automate the core functions, such as voting rules, milestone releases, reimbursement protocols, and compensation, enhancing transparency and reducing the need for intermediaries. Patient health data remains encrypted with access granted only through patient consent mechanisms (e.g., zero-knowledge proofs/ZKPs), ensuring privacy whilst enabling secure and efficient participation. Zero-knowledge proofs/ZKPs are cryptographic blockchain methods that allow one party (the “prover”) to demonstrate to another party (the “verifier”) that a statement is true without revealing the supporting underlying data [53]. For a healthcare DAO, this would allow a patient to prove eligibility for a service, verify adherence to treatment milestones, or consent to data use without exposing their raw health information, as some examples. ZKPs are especially valuable in integrative healthcare, where sensitive information encompasses physical, psychological, and social domains that require strong safeguarding.

Force-directed layouts, such as those depicted in Figure 4 below (used in computational geometry [53]), demonstrate how DAO networks can take on different organizational shapes depending on the encoded rules and the activity of overall wellness community/organization. These variations highlight that there is no single “cookie-cutter” or standardized DAO structure. Instead, each healthcare DAO evolves in real time, shaped by its participants and context defined by the aforementioned layers.

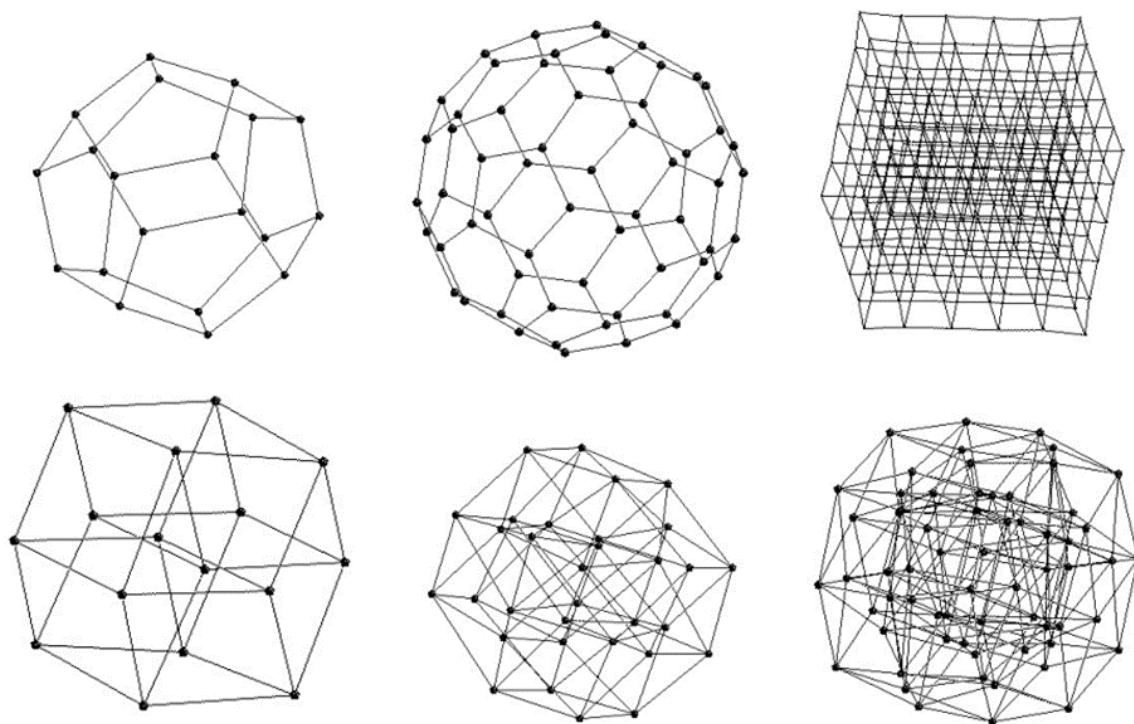


Figure 4 Examples of emerging shapes using force-directed algorithms. Above row: small graphs: dodecahedron (20 vertices), C60 ‘bucky ball’ (60 vertices), 3D cube mesh (216 vertices). Below row: Cubes in 4, 5, 6 Dimensions. *Reprinted with permission [54].*

6.1 Hypothetical Use Case: Simulation

To ground this architecture in a real-world example, the following is one possible scenario:

- **Patient Enrollment and Engagement:** Kiki joins the DAO as a wellness steward by registering and securely sharing their health data on the blockchain. Kiki participates in mindfulness sessions and earns tokens that reflect their engagement and contribution.
- **Clinical Care Delivery:** Dr. Casey, an integrative clinician, provides personalized care. Smart contracts log milestones and issue tokenized compensation based on verified outcomes. Once authorized, the tokens are allocated between fiat conversion for daily use and digital asset staking for long-term value growth, reflecting Dr. Casey’s individual preferences. Allocations can be adjusted at any time through the DAO interface, with changes automatically executed and recorded on the blockchain via smart contracts, in real time and without intermediaries.
- **Research Collaboration:** Dr. Lucero, a researcher, proposes a novel treatment protocol. Once the project is approved by the DAO, Dr. Lucero’s expertise guides the orchestration of the research, ensuring methodological rigor. Meanwhile, the DAO community collectively participates in priority-setting, funding decisions, and milestone verification, all of which are executed automatically via smart contracts and immutably recorded on the blockchain for full transparency and auditability.
- **Self-Regulated Community Insurance Fund:** A predetermined portion of each wellness steward’s earned tokens is automatically allocated to the DAO’s insurance fund. Contributions are agreed upon collectively, needs-based, and calculated to cover community healthcare without inflated corporate profit margins. Smart contracts automate allocation and claims processing, ensuring equitable coverage for all stewards while remaining transparent and self-

governed. This mechanism functions similarly to traditional payroll-based insurance deductions but reduces overhead, ensures real-time transparency, and reinvests funds directly into patient care and community wellness.

- **Insurance and Claims Processing:** Kiki submits a claim for acupuncture therapy. A smart contract verifies and reimburses directly, eliminating intermediaries.
- **Governance and Decision-Making:** All wellness stewards, including Kiki, Dr. Casey, Dr. Lucero, and all other participatory roles in the ecosystem including elected administrative leaders, use governance tokens to vote on proposals, clinical guidelines, funding allocation, and more.
- **Financial Sustainability:** Tokens can be exchanged, staked, or reinvested in community wellness projects. AI tools monitor token flows, preventing misuse and ensuring ecosystem stability.

This simulation illustrates one possible instantiation of a potential model. In practice, DAO structures/procedures will vary according to encoded rules and community priorities that are defined by the associated blockchain, smart contracts, and adaptive governance applied. Hence, once established, DAO structures remain values-based and mission-centric. The correspondence between the technical layers and the simulated scenario provided, demonstrates the coherence between conceptual architecture and practical testability towards a framework that can be adapted and empirically evaluated across diverse integrative healthcare settings.

7. Legal Implications of DAOs: Real-World Examples

Presently, the legal status of DAOs remain ambiguous. DAOs represent a new algorithmically-coordinated framework for organizational activity that lacks a centralized leadership structure, making them difficult to categorize under existing corporate law or fit neatly into any legalized 'box'. The knock on effects of this are outstanding questions with regards to liability, taxation, and regulatory compliance, all of which are paramount in healthcare operations and accountability. Albeit, this may not be a barrier, but a golden opportunity to design legal identities that reflect an organizations' mission and operational needs as it moves into a DAO-based framework. Several models already exist that allow DAOs to interface with legal and financial systems whilst preserving their decentralized ethos. A first example in 2014 comes from the cryptocurrency and Web3 organization, the Ethereum Foundation [55, 56], that was assembled as a 'Stiftung' (foundation) in Switzerland. The Stiftung legal structure is common in Swiss civil law because it allows the creation of a non-profit entity governed by a founding charter and board, without shareholders and members [57]. The Stiftung structure offers strong global legal standing and ensures that organizational assets are used solely for the foundation's mission, such as stewarding public infrastructure like blockchain networks, rather than generating private profit. Additionally, the "Verein" legal structure under Swiss law allows a member-based association for various entities to merge as one unified status, whilst maintaining local regulations with regards to liability and financial/taxation responsibilities. This has provided other DAOs a successful template, forming under Swiss Verein structures to manage assets, issue grants, and serve as legal wrappers [58, 59]. Both Stiftung and Verein wrappers show how DAOs can strategically leverage traditional legal structures to support innovation whilst maintaining legal compliance.

In the USA, legal innovations have also emerged to integrate DAO-based structures within existing regulation. In 2021, the state of Wyoming was the first to pass legislation officially

recognizing DAOs as a new form of Limited Liability Company (or LLC), followed by similar laws in Tennessee and Utah. This initial legal framework allows DAOs “legal personhood” under a ‘DAO LLC’, and thus, asset ownership rights and contractual capacity, whilst maintaining decentralized governance [58, 60, 61]. To note, in 2018, Vermont laws allowed “blockchain-based limited liability companies (BLLCs)” to govern themselves using blockchain technology, a precursor of sorts to DAO LLCs [62]. Furthermore, in 2022, the Republic of the Marshall Islands introduced a purpose-built legal framework specifically tailored for DAOs [63]. This has propelled a significant evolution in corporate lawmaking, initiating new legislation opposed to simply adapting existing corporate law. Thus, it permits DAOs to exist as legitimate internationally operable entities engaged in decentralized governance (i.e. no board of directors or centralized management required) and digitized asset-based operations (blockchain-based voting and smart contract mechanisms) with supporting statutory verbiage. In sum, the legal foundations for DAOs are in flux. However, recent legislative advancements have established an actionable template for legal existence and real-world implementation. For healthcare innovators and policymakers, this presents a timely opportunity to shape DAO governance in ways that are optimally designed for healthcare systems. This is particularly germane for integrative healthcare organizations seeking to decentralize governance, align operations with mission-driven values, and cultivate transparent, community-based decision-making. The emerging legal landscape of DAOs provides the necessary protection and flexibility to design decentralized healthcare ecosystems grounded in holistic innovation, community values, and equitable care.

Aside the aforementioned legal uncertainties, several other practical challenges remain. Such as technological barriers, adoption resistance, and interoperability with existing healthcare regulations. Moreover, the inherently democratic structure of DAO governance may lead to slower uptake initially, as participants acclimatize to algorithmic voting and decentralized decision-making processes. In contrast, reliance on a centralized authority such as a CEO to make ultimate decisions might seem more straightforward. However, once established and seamlessly integrated within organizational structures, DAOs will enable greater efficiency, equity, and transparency, while reducing susceptibility to the errors and biases of individual executives, or to decision-making processes that prioritize narrow (perhaps even opaque) interests over community-wide healthcare benefit. Additionally, operationalizing EVNs, hybrid financial structures, and decentralized insurance models will require iterative testing and refinement. Such issues have been discussed throughout this work, albeit directions for future research may explore rigorous empirical validation, implementation strategies, and evaluation of outcomes in real-world healthcare settings.

8. Synthesis

Here, we propose a new strategic pathway for integrative healthcare to evolve into a mainstream medical specialty by leveraging metaversal technologies, particularly blockchain and smart contracts. In doing so, we present architecture for expanding metaversal integrative healthcare through DAOs as viable alternatives to hierarchical, administrator-heavy systems, with the intention to offer more transparent, participatory, and efficient governance and operations. Whereas legacy institutions often confine participation to symbolic gestures for most employees, DAOs operationalize equitable collaboration by structurally integrating stakeholder input, co-governance, and tokenized value distribution that enables meaningful participation, shared decision-making,

and direct value redistribution to all who sustain the care of the ecosystem as a whole. Central to this vision is a new value metric, which we term Ecosystem Value Networks (EVNs), that assesses contribution based on real-time dynamism, interconnectivity, and systemic impact, rather than traditional hierarchical rank/title, billing codes, or institutional prestige. We also rethink fiscal operations by proposing hybrid compensation that integrates digital assets with fiat currency, to facilitate a sense of belonging and long-term investment in the overall healthcare ecosystem. Moreover, DAO-governed, community-driven funding structures may disrupt traditional health insurance policy by eliminating intermediary gatekeepers and aligning financial flows with shared values. This framework is built on applied systemic logic where transparency, equity, and interconnectivity are embedded into its architecture as operational imperatives, not ideals. It stems from the foundational insight that healthcare systems flourish when all contributors, not only the credentialed few, are structurally valued and materially supported. DAOs and EVNs have the potential to change how we organize, re-assess how value is defined, and re-condition how organizations behave. Prosocial engagement emerges not by chance, but by design, since it is encoded into the system's logic and rewarded through programmable mechanisms like governance tokenomics and smart contract-driven behavioral feedback loops. Over time, this conditions a self-reinforcing ethos of collaboration, where the incentives for individual success align with collective wellbeing. When systems evolve to reflect interconnectedness, value is no longer extracted, rather it becomes emergent, relational, and regenerative. As these systems scale, they re-program a behavioral shift that becomes the “new normal”, a paradigm in which dominance and competition are outdated and replaced with interconnectivity and shared purpose. This marks an infrastructural innovation and evolutionary leap in how we define value, leadership, and healthcare system design.

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Author Contributions

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The author used AI as an editorial assistant to check for typos, grammar, clarity, and conciseness. However, this process was not automated and was overseen by the author. All intellectual content, analysis, and writing are the sole responsibility of the author.

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