

In collaboration with the Wharton
Blockchain and Digital Asset Project



Decentralized Autonomous Organization Toolkit

INSIGHT REPORT
JANUARY 2023

Contents

3	Foreword
4	Executive summary
6	Introduction
7	1 What are DAOs?
7	1.1 Distinguishing characteristics
8	1.2 Understanding the DAO landscape
9	1.3 DAO opportunities and challenges
10	2 DAO operations
10	2.1 Operational strengths and weaknesses
12	2.2 DAO participants and services
12	2.3 The contributor experience
14	3 DAO governance
14	3.1 DAO frameworks
15	3.2 Voting processes
17	4 Legal structures
17	4.1 The need for legal formalization
18	4.2 Traditional legal wrappers
19	4.3 Bespoke legislative frameworks
20	4.4 Implications of legal structures
23	5 Recommendations
23	5.1 Operational
24	5.2 Governance
26	5.3 Legal and policy
27	Conclusion
28	Appendices
28	Appendix 1: DAO typology assessment
29	Appendix 2: DAO governance assessment
30	Appendix 3: DAO governance strategies
31	Appendix 4: Common open-source DAO frameworks
33	Contributors
36	Endnotes

Disclaimer

This document is published by the World Economic Forum as a contribution to a project, insight area or interaction. The findings, interpretations and conclusions expressed herein are a result of a collaborative process facilitated and endorsed by the World Economic Forum but whose results do not necessarily represent the views of the World Economic Forum, nor the entirety of its Members, Partners or other stakeholders.

© 2023 World Economic Forum. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, including photocopying and recording, or by any information storage and retrieval system.

Foreword



Brynly Llyr

Head of Blockchain and Digital Assets, Crypto Impact and Sustainability Accelerator, World Economic Forum, USA



Aiden Slavin

Project Lead, Crypto Impact and Sustainability Accelerator, World Economic Forum, USA



Kevin Werbach

Professor of Legal Studies and Business Ethics and Director, Blockchain and Digital Asset Project, Wharton School, University of Pennsylvania, USA

Decentralized autonomous organizations (DAOs) are an emerging part of the blockchain ecosystem and potentially a significant innovation in organizational structures. Modern firms have developed into some of the largest and most powerful enterprises in human history, yet they have been criticized for being too bureaucratic and insufficiently equitable and inclusive. And communities, workers, the environment and other key stakeholders are often left without a meaningful voice in the governance of these enterprises. The DAO phenomenon can be viewed as a technical complement to grassroots and formal efforts to create more responsive organizations. DAOs seek to restructure hierarchical management set-ups and the classical separation of ownership and control by broadening participation in governance and aligning rewards with labour, contribution and participation. Thus, while DAOs serve functional objectives for blockchain-based communities, such as managing protocol-based networks and applications, facilitating investments, funding public goods and encouraging social interactions, they may also represent a broader innovation for society.

The potential to manage the interests, voices and preferences of diverse participants through transparent and open technology is worthy of both cross-disciplinary interest and careful interrogation. But in using still-maturing technology to address potentially diverging and evolving stakeholder interests, DAOs may face both operational and governance challenges. The legal and regulatory landscape for DAOs is both uncertain and uneven, creating questions and risks for participants. How effectively DAOs can scale in size, scope and

sophistication while meeting their aspiration of a flat, decentralized organization is a question that communities are exploring in real time.

Over the past two years, we have witnessed an explosion of activity in the blockchain-fuelled area now called web3. In 2020, the value of assets locked in decentralized finance (DeFi) smart contracts increased 18-fold, from \$670 million to \$13 billion. In 2021, the total value locked in DAO treasuries increased by a factor of 40, from \$380 million to \$16 billion. DAOs offer a significant new mechanism for managing and allocating capital or other valuable digital assets. But, as we will explore, the story is larger than that. DAOs are an organizational development the impact of which may be felt across many sectors of business and social activity worldwide.

In this toolkit we provide a set of insights and resources for developers and policy-makers. Our goal is to provide tools to increase understanding, demystify DAO operations, enhance DAO governance and frame the legal and regulatory questions. This resource, the output of a diverse global community – including industry leaders, academics, technologists and entrepreneurs – builds upon our introductory report, [Decentralized Autonomous Organizations: Beyond the Hype](#). It sets forth frameworks for this multifaceted organizational innovation, illustrating the variety of ways to encode relationships, rewards, incentives and collaboration. This toolkit also outlines the possible liabilities and risks of DAOs, and our hope is to offer all interested stakeholders a useful resource for evaluating, engaging with or developing DAOs.

Executive summary

Decentralized autonomous organizations (DAOs) are organizational structures that use blockchains, digital assets and related technologies to allocate resources, coordinate activities and make decisions.



DAOs are an emerging part of the blockchain ecosystem. Although the concept of a DAO was theorized in the 1990s, it was not until recently that DAOs began to be built, growing rapidly across sectors. As activity in decentralized finance (DeFi) exploded in 2020, DAOs emerged to help manage resources and serve as a mechanism for collective decision-making. In 2021 alone, the value of DAO treasuries expanded by a factor of 40, from \$380 million to \$16 billion, and the number of participants increased 130 times from 13,000 to 1.6 million.¹ From finance to social networking to philanthropy, these digital, communal organizations attempt to reimagine how we connect, collaborate and create.

While there is a wide variety of DAOs, many face similar and significant operational, technical, governance and legal challenges. To help address these challenges this report offers a set of tools for developers, policy-makers and other stakeholders

engaging with DAOs. Crucially, its aim is not to provide a comprehensive analysis of the DAO ecosystem but to offer a set of adaptable resources for key stakeholders to help realize the full potential of this emerging form.

1. What are DAOs?

DAOs attempt to enable communities to achieve their goals while diminishing the need for intermediaries to manage governance and operations. DAO tokens allow holders to vote on changes to the organization. The use of blockchains and digital assets reduces the need for trust in third parties and provides a means of rewarding contributors. By decentralizing governance across several stakeholders and disclosing operational and financial information, DAOs can reduce information and power asymmetries. In recent years there has been an explosion of DAO activity, with

builders developing DAOs as well as tooling and infrastructure to facilitate the process of launching and managing them. Nonetheless, DAOs face a variety of operational, technical and legal challenges.

2. DAO operations

Code-driven and community-oriented, DAOs operate differently from traditional organizations. By enabling stakeholders to participate directly in operations and governance, DAOs have the potential to align the interests of a variety of stakeholders more equitably. However, DAOs face several challenges in people operations, coordination and more. Strategies including decentralization, standardized onboarding practices, specialized working groups and compensation modalities, as well as the use of DAO tooling and infrastructure, can help address many of these challenges.

3. DAO governance

DAOs employ a variety of governance processes to balance efficiency and effectiveness. Governance frameworks codify an organization's purpose, roles and responsibilities, incentives and more in smart contract code. Voting processes seek to increase efficiency while mitigating common governance issues such as rational apathy and plutocracy. Indeed, DAOs are beginning to codify a variety of strategies to address operational, legal, technical and economic governance challenges.

4. Legal structures

DAOs use a variety of strategies to address legal and regulatory questions. Some adopt a formal entity structure, or wrapper, to define legal treatment. Several legal wrappers, including unincorporated non-profit associations (UNA) and limited cooperative associations (LCA), are available to DAOs. Yet using a legal wrapper may involve financial obligations and other requirements. Bespoke legal frameworks offer DAOs an alternative path to recognition. Legal structures used by DAOs have implications beyond corporate law that extend to securities law, the taxation system and anti-money laundering requirements. Factors such as mission, operational activity and constituency determine the best legal response to the issues a DAO raises.

5. Recommendations

The needs of a DAO depend on its purpose, community and composition; it is thus difficult to recommend strategies for DAOs generally. In addition, strategies already implemented may need to be adapted as a DAO evolves. Nonetheless, DAOs are beginning to create strategies to operate and govern themselves effectively. Rather than provide an exhaustive set of recommendations, this report offers a starting point for DAOs to develop effective operational, governance and legal strategies. Defining goals, developing administrative practices and dividing labour can help DAOs operate. DAO governance can benefit from building and maintaining strong voting practices, accountability processes and checks and balances.



Introduction

DAOs differ widely, but many must answer a common set of operational, governance and legal/regulatory questions. This toolkit aims to help that process along.

Decentralized autonomous organizations (DAOs) are organizational structures that use blockchains, digital assets and related technologies to direct resources, organize activities and make decisions. Community-oriented and code-driven, DAOs attempt to provide an alternative to traditional organizational forms by making operational information publicly available and enabling members to participate in governance.

The concept of DAOs has been around for some time. In recent years, however, the DAO ecosystem has undergone explosive growth in areas ranging from finance to social networking to philanthropy. The combined value of DAO treasuries increased by a factor of 40 (from \$380 million to \$16 billion), and total DAO participants skyrocketed 130 times in 2021 alone.² Yet DAOs also face significant operational, governance, legal and regulatory challenges.

While the DAO ecosystem is diverse, there are commonalities in the operational, governance and legal and regulatory questions different DAOs must answer. The aim of this report is to offer resources for developers, policy-makers and other stakeholders seeking to build, engage with or evaluate DAOs.

Building on the Forum's previous report in this series, [Decentralized Autonomous Organizations: Beyond the Hype](#), Section 1 of this report defines DAOs, providing a brief history and discussing the opportunities and challenges they create. Section 2 offers an overview of DAO operational processes, constituents and services, describing how DAOs differ operationally from traditional organizations and their advantages and disadvantages. Section 3 provides a detailed discussion of DAO governance processes, challenges and mitigation strategies. Section 4 delivers an overview of the major legal and regulatory questions DAOs must face. Section 5 includes a discussion of best practices for DAO operations and governance, providing suggestions for crypto developers on how to optimize performance. In a series of appendices, the report offers tools for analysing DAOs from a typology, operational, governance and legal perspective.

Rather than provide a comprehensive analysis of a heterogenous and burgeoning ecosystem, this toolkit offers a set of general-purpose, modular tools to understand this emerging organizational form and explore how different DAOs might reach their full potential.³

This report is the product of an international collaboration among blockchain and digital-asset experts, established firms, policy-makers, non-profits, legal experts, academics and others. It forms the second output of the DAO Project Series, co-led by the World Economic Forum's Crypto Impact and Sustainability Accelerator (CISA) and the Wharton Blockchain and Digital Asset Project (BDAP). A forthcoming report will examine impact DAOs, reflecting on early attempts to leverage this novel organizational form for social impact.

CISA is a project of the World Economic Forum that seeks to drive progress on environmental, social and governance (ESG) targets for the crypto ecosystem. Building upon the work of the Forum's Blockchain and Digital Assets platform and a global network of contributors, the initiative explores emerging topics across the crypto ecosystem, such as DAOs, in an attempt to build coalitions, offer guidance and shape a cohesive narrative on crypto policy and impact.

BDAP is a research initiative at the Wharton School of the University of Pennsylvania, focused on the evolving blockchain phenomenon. Drawing on world-class Wharton/Penn faculty, alumni and students, as well as relationships with academics, government officials and industry experts from around the world, BDAP seeks to enhance understanding and bridge gaps among stakeholder communities.

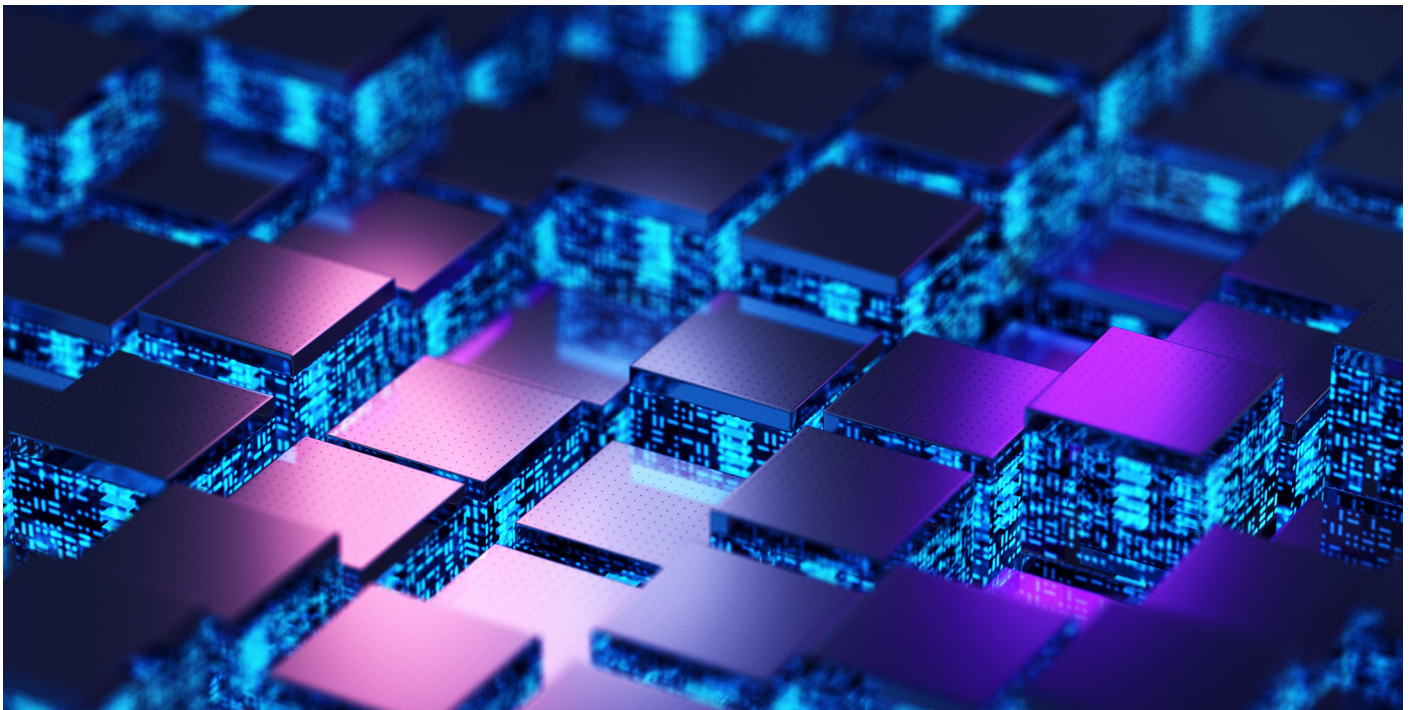
1

What are DAOs?

DAOs are an experiment in governance. The use of open-source software, blockchain technology and programmable incentives may enable them to offer enhanced transparency and adaptability. Yet they also face a host of challenges.

DAOs aim to enable communities to achieve their goals while reducing the need for intermediaries or centralized leadership to manage operations. DAOs typically run on public, permissionless blockchains, with their actions and governance encoded in open-source software and enforced by smart contracts.⁴

This section offers an overview of what distinguishes DAOs from traditional organizational forms, a brief history and taxonomy of the DAO landscape, as of early 2022, and a discussion of the opportunities and challenges DAOs create.



1.1 Distinguishing characteristics

Although the ecosystem is heterogenous and evolving, DAOs tend to have three distinguishing characteristics:

1. Use of blockchains, digital assets and related technologies
2. Allocation and coordination functions
3. Decentralized governance

In practice, different DAOs will adhere to these criteria to varying degrees. For example, some DAOs decentralize governance more extensively than others. Likewise, as a DAO evolves, the degree to which it adheres to each dimension may change as well. Throughout this toolkit, case studies are provided to ground the conclusions in practice and provide a nuanced view of the DAO ecosystem. Box 1 offers a flow chart for evaluating whether an entity could be classified as a DAO.

1 Leverages blockchains, digital assets and related technologies?

Blockchains, digital assets and related technologies are the means by which DAOs can make financial and operational information publicly accessible. Although some DAOs make use of subgroups to manage certain processes, in many cases involvement in DAO operations does not require trust in a third-party intermediary or centralized manager to take certain actions. Digital assets can be used to reward or incentivize contributors to a wide variety of ends. Smart contracts can execute actions based on pre-existing parameters, streamlining DAO operations. Moreover, the open-source nature of public blockchains and smart contract logic enables developers to rapidly create or modify DAOs.

2 Coordinates activities and/or allocates resources?

Coordination and allocation functions mean that DAOs, like traditional firms, manage resources, which may mean coordinating activities

or allocating capital. For example, DAOs may compensate people for work they do, oversee the operation of a protocol providing financial services or direct funds to the development of public goods.

3 Is governed primarily on a decentralized basis?

Decentralized governance means that DAO participants work together to make decisions, voting on and ratifying proposals. For example, DAO participants can vote to allocate resources from a treasury to a project. In assessing a DAO, it is critical to understand how decentralized its governance is in practice, as political, legal and economic factors can have de facto centralizing effects, concentrating power in a minority. Critically, decentralized governance can make DAOs more resilient, mitigating risks stemming from centralized control. Section 3 offers a discussion of DAO governance and Appendix 2 provides an evaluation framework to help determine how collaboratively a DAO is governed.

1.2 Understanding the DAO Landscape

Although the term “DAO” was coined in the 1990s, it was not until recently that developers began building these entities.⁵ The first functional organization calling itself a DAO, known simply as The DAO, was created in 2016 as a platform for collective investment in projects on the Ethereum blockchain. After raising about \$150 million in value in less than a month from more than 11,000 participants, a vulnerability in the DAO’s code was exploited, and The DAO was abandoned as part of a “hard fork” in the Ethereum network to restore the funds.⁶

Subsequent developers began creating enhanced DAO tooling and infrastructure to mitigate the limitations of The DAO and to make launching, managing and operationalizing DAOs easier. This activity was complemented by the growth of blockchain-based platforms more broadly as well as the emergence of significant markets for DeFi and non-fungible tokens (NFTs).

Friends with Benefits (FWB) is a community DAO for web3 creatives.⁷ FWB requires all interested parties to submit an application in addition to holding \$FWB tokens. The DAO enables large-scale coordination of this decentralized social group to fund and implement projects ranging from publish-

ing content to producing events. The growing FWB community publishes editorial content and holds live activities, such as informal networking opportunities, in addition to hosting online conversations among members.

There are many types of DAOs, as illustrated in the case studies throughout this report. *In Decentralized Autonomous Organizations: Beyond the Hype*, the World Economic Forum and Wharton classified DAOs into nine categories according to their means and objectives:

- What is the primary purpose of the DAO? Is it generative, seeking to perform an ongoing

function? Associative, seeking to bring together a community? Or is it ad hoc, developed to serve a specific, one-off purpose and then dissolve?

- How does the DAO plan to achieve its objectives? Does it facilitate an activity, allocate financial resources or oversee the actions of people?

As a DAO evolves, its purposes and means may change; a DAO that begins as a flashmob may grow into a community DAO over time. Indeed, the flexibility to adapt to changes over time is a key feature of this novel organizational form. DAOs may

also be categorized based on their governance mechanisms and legal structures. Section 3 provides a discussion of DAO governance, and Section 4 offers an analysis of legal arrangements that DAOs are adopting.

1.3 DAO opportunities and challenges

DAOs attempt to solve several problems created by traditional centralized organizations. Centralization creates efficiencies. However, by consolidating decision-making capacities and resources (both financial and informational), centralization can interfere with alignment among stakeholders, accountability, participation and operational resilience. In a DAO with an equitable distribution of tokens, many token holders, not just the leadership, can play a role in decision-making. DAOs that make operational and financial information viewable on a blockchain can partly address the problem of

information asymmetry, providing contributors – and the public – with actionable information. Likewise, by leveraging token-based economic incentives, DAOs can be structured to reward contributors in an equitable manner and direct activity towards communal goals. Moreover, through smart contracts, DAOs may streamline decision-making execution. Finally, the flexible, open nature of DAOs can enable contributors to discuss and develop their goals; as a DAO evolves its community can opt to deploy resources towards new projects, expanding its impact.

BOX 3

Bitcoin DAO

Bitcoin is a platform for building and funding digital public goods, such as open-source software. To date, it has provided more than \$40 million in funding via hackathons, grants, crowdfunding and its accelerator. Bitcoin rewards grants via quadratic funding, which identifies community support by weighing the number of contributors more than the amount funded.

Bitcoin launched its BTC governance token in May 2021 and is in the process of progressively decentralizing via its Bitcoin DAO. The Bitcoin DAO oversees the community treasury as well as a governance framework for delegates called stewards to participate in key ecosystem decisions. Bitcoin DAO plans to gradually introduce more formal frameworks for the ongoing development and maintenance of Bitcoin managed through on-chain voting.

However, DAOs also have limitations. By attempting to engage many contributors in governance decisions, DAOs can create inefficiencies. Without clearly defined roles, many DAOs face coordination challenges. These are often augmented by inadequate tooling, preventing some DAOs from efficiently performing basic functions. While functional DAOs that power a network or application may not require extensive coordination, community DAOs may encounter challenges when scaling. DAOs may also face governance challenges, such as voter apathy and concentration of power. For example, while in some cases a change in strategy may represent the majority opinion of a DAO's membership, in other cases it may be the outcome of a resource-rich minority voting in its own interest. It is worth noting that this risk is also present in traditional organizations. Like

the blockchains on which they operate, DAOs also confront limitations of scalability and cybersecurity vulnerabilities as well as adversarial challenges such as protocol-level attacks. DAOs may violate contributor privacy through the transparent recording of their actions, or they may be opaque in operation, making it difficult for participants to fully understand the risks. Perhaps most acutely, DAOs confront a lack of legal and regulatory clarity.

Although DAOs face many challenges in comparison with traditional organizations, centralized organizations have benefited from a long history of trial and error. DAOs are an experiment in governance and, with time, it is possible that many of these challenges will be addressed in a decentralized manner. This toolkit delves into these challenges and identifies potential responses.

2

DAO operations

DAOs may be able to engage different stakeholders more equitably and inclusively, but they also face operational challenges that may limit their efficacy.

This section addresses how DAOs operate differently from traditional organizations. It also reviews the types of DAO participants and services

and summarizes the processes for identifying, joining, contributing to and being compensated by a DAO.



2.1 Operational strengths and weaknesses

It is illustrative to imagine how a traditional, centralized organization could change if it were operated as a DAO. A digital marketplace designed to connect buyers and sellers, such as Amazon or eBay, has a board of directors, executives and staff with defined responsibilities and powers. The company mediates disputes, sets fees and develops policies for the users of the platform. These companies are ultimately answerable to the shareholders, while users of the platform have limited ways to influence company policies, and other stakeholders have even less agency. Likewise, centralized leadership creates information asymmetries, further disenfranchising many stakeholders.

As a DAO, by contrast, the marketplace may be able to harmonize the interests of various stakeholders. Rather than having a board of

directors and executives making decisions, buyers and sellers could participate directly in determining how fees should be assessed and policies applied. Tokens could be used to reward buyers and sellers who act in line with the operational goals of the platform, by attaining high customer ratings, for example. As with other alternative forms of organization, the marketplace DAO has the opportunity to more equitably take into account the interests of multiple platform stakeholders.

However, DAOs also face operational challenges. Recruiting, onboarding and managing contributors can be tricky. DAOs can confront legal and logistical difficulties in establishing contractual relationships, opening bank accounts and engaging with external service providers. Furthermore, DAOs often struggle to maintain and transfer institutional knowledge to

newcomers, potentially giving early contributors disproportionate power. The uncertainty of compensation mechanisms may make it difficult for DAOs to retain high-quality talent. Pseudonymous DAOs may have difficulties distinguishing genuine contributors from inauthentic users or in meeting compliance requirements. In an attempt to reduce legal and operational challenges, some DAOs limit themselves to holding or interacting with digital assets, potentially curtailing their reach. DAOs are also affected by the digital divide and may struggle to engage contributors with limited access to power and connectivity. Moreover, a lack of digital literacy or language skills may make it difficult for contributors to participate.

DAOs have pioneered a variety of mitigation strategies in an attempt to address such challenges. Many have adopted a progressive approach to decentralization, where a small group manages certain critical tasks of the organization and then transitions decisions to community vote and smart contracts – although, depending on how this transition is executed, it may create other challenges.⁸ By implementing smaller structures, such as sub-DAOs, or by delegating powers for specific tasks, DAOs can streamline day-to-day functioning. For example, as DAOs scale, many opt to employ a representative model, enabling token holders to delegate their vote to an individual or group charged with a specific mandate. Some delegates handle financial decisions, while others engage in technical operations.

By specializing the functions of delegates, DAOs can improve the alignment between contributor skills and organizational needs. Orca, for example, offers tooling for DAOs to develop smaller working groups, or pods, that can take on specific tasks as required. DAOs may benefit from localization; by empowering community members to engage local participants, especially during onboarding, DAOs can more effectively interact with their communities. DAOs can also make use of time-limited goal-setting processes, such as season planning, to streamline operations. By identifying active contributors and rewarding them, DAOs can incentivize increased participation. For example, Gitcoin DAO makes use of a system of steward health cards that measure factors such as voting activity to encourage participant engagement.⁹ Likewise, by compensating delegates, DAOs can empower a broader range of participants to contribute, potentially enhancing equity and efficacy. Delegate compensation can, however, also lead to further resource concentration. Other DAOs have implemented weighted voting, rewarding participants who engage more often. DXdao has non-transferable assets associated with addresses used to vote on proposals, so that each time that token is used, holders receive more voting tokens. Because a DAO is a programmable technology that can automatically weight and assess actions based on various inputs, there can be any number of ways to structure, reward and encourage positive behaviours, as defined by each DAO.

BOX 4

NounsDAO

Launched in August 2021, NounsDAO is the governing body of the Nouns ecosystem, a platform for the generation and auctioning of generative NFT art projects. Nouns are on-chain, 32x32-pixel avatar NFTs built on Ethereum, each with its own distinct and randomly selected set of character traits. Each day, the Nouns protocol creates and auctions a new Noun to the highest bidder, and the NounsDAO treasury collects 100% of the ETH earnings (the native cryptocurrency of the Ethereum blockchain) generated from nine out of 10 of these daily auctions. For the first five years of the project's operation, the proceeds from every 10th Noun auction are delivered to a multisignature (multisig) wallet jointly owned by the 10 Nouns ecosystem founders (known as the "Nounders"). Each Noun carries membership and voting rights for the NounsDAO, so all Noun holders have a vote in governance matters of the NounsDAO and may submit proposals for member approval.

As of October 2022, the NounsDAO treasury held 29,243 ETH. These funds are allocated through proposals by NounsDAO participants (i.e. holders of Nouns, or their third-party assignees) to projects that further the long-term growth and global visibility of the Nouns brand. NounsDAO treasury funds have been used to fund projects such as commissioning monthly Nouns-themed comic books and the establishment of Nouns Studio1, a branding platform for the Nouns ecosystem. The Nouns Foundation was established to provide a legal entity to interface with non-crypto native organizations and fiat-based infrastructures to facilitate the success of these projects.

2.2 DAO participants and services

Once launched, a DAO can distribute tokens to members. Over time, contributors can perform a variety of membership roles. There are several types of DAO participants:

- Founders or founding teams can develop a unifying mission for a project and begin building. If successful, founders can attract a wide variety of participants to contribute to the DAO.
- Treasury multisig signers oversee a DAO's multisig wallet (a wallet requiring separate keys to authorize a transaction), allocating resources in line with the DAO's purpose. Gnosis Safe, a popular multisig wallet for DAOs, now operates as a DAO itself.
- Deployment multisig signers carry out changes to smart contracts based on community votes, with timelock functions providing a community check on changes.
- Delegates in some DAOs are appointed to representational councils to serve specialized functions.
- Core contributors may be entitled to receive token incentives for ongoing contributions to the DAO.
- Token holders are the broadest category of DAO participants. DAO tokens can provide governance functionality, reward for direct efforts or other utility relative to their potential benefits as investments.

In addition to DAO participants, there is also a vibrant ecosystem of providers of DAO services, or

tooling. Business-to-DAO (B2DAO) organizations provide tools to facilitate DAO community management, discovery and analytics, governance and voting, administration – and more.¹⁰ Many of them are centralized services operated by traditional companies, even though they are employed for DAOs. Discord, originally created for voice chat in multiplayer games, is a popular community-management and discussion platform for DAO participants. Analytics services such as DefiLlama aggregate data such as total value locked (TVL), one measure of the overall value of crypto assets in a project, to help participants understand the DAO ecosystem. Snapshot enables DAOs to support a wide variety of voting processes. Administrative tools support processes including onboarding, compensation, skills development and creating job boards. Providers of DAO operating systems offer libraries of composable DAO tooling to create off-the-shelf functionality for communities. Furthermore, providers such as Syndicate offer solutions for investing in off-chain assets. Finally, some functions that are likely to be repeated across DAOs by groups of contributors that specialize in a specific task, such as treasury management, may also be performed by service DAOs, such as Llama, rather than by individual contributors. Nonetheless, there is a widely recognized need for further DAO tooling.

Many existing B2DAO services have limitations stemming from their off-chain nature or costliness. For example, much DAO voting takes place off-chain on services that may limit the transparency and accountability of DAO governance. As tools are emerging to provide more services to DAOs on-chain, some DAOs are making use of current tooling as an intermediary step towards leveraging tools that are fit-for-purpose and cost-effective.

2.3 The contributor experience

Although the experiences of DAO contributors are heterogeneous and dynamic, it is possible to identify some commonalities across participant types. The first step in participating in a DAO is to identify a community that aligns with an individual's skills and interests. Discovery and analytics services offer information to new participants about various DAOs and how they can contribute. Individuals can begin exploring DAOs by attending community calls, joining public Discord servers or providing feedback on open proposals.

Once an individual has identified a DAO to which they would like to contribute, they can become a member by fulfilling its joining criteria and, if available, undergoing onboarding. Although onboarding practices differ across DAOs, they

generally consist of conveying the mission of the DAO, facilitating connections with existing DAO contributors, providing relevant educational resources and plugging an individual into relevant subgroups within the DAO.¹¹ Some DAOs have adopted a seasons-based approach to adding contributors, whereby new participants can apply to join for a set period to work on a specific project.¹² Once onboarded, an individual can begin to demonstrate their value by supporting the work of the DAO. The type of work will depend on the kind of contributor and the needs of the DAO. Content creators, for instance, can identify a marketing asset required by the DAO and then create and publicize it to demonstrate their skills. Other contributors begin to participate in a DAO by completing one-off projects, such as coding new software features,

for a reward. This process enables an individual to develop a résumé of skills, demonstrating their value to the community. Indeed, there is even a growing suite of tools to enable contributors to attest to and verify their skills within a DAO.¹³ Eventually, a contributor may be able to secure longer-term engagements with a DAO.¹⁴ Moreover, individuals can – and do – contribute to multiple DAOs simultaneously.

For contributors, relevant activity often occurs on community-management platforms such as Discord and Telegram. Developers, for instance, may find discrete tasks in a Discord server or on a bounty board, which collate projects nominated by community members and associated rewards. With DAO contributors participating around the world, many of them tend to work asynchronously, making progress and then sharing with the group for review. Work may be reviewed by working groups composed of contributors with specialized skills, such as software engineers, or by general-purpose review bodies.

Apart from their individual work, some contributors also participate in operational functions such as treasury management and voting oversight. Treasury-management functions include budgeting, reporting and diversification. Other contributors participate in voting oversight. Some DAOs allow all token holders

to vote, while others restrict voting to those who perform specific tasks or stake. To limit costs of on-chain transactions and facilitate signalling of likely outcomes, DAO voting typically occurs in off-chain decentralized platforms such as Snapshot.

Compensation practices vary widely across DAOs. CabinDAO, Lido Finance and Gitcoin employ workstreams to iterate on their compensation practices. Workstreams are empowered to create their own budgets, practices and compensation structures. By dividing the work of the DAO into different streams, and segmenting compensation accordingly, DAOs can tailor compensation practices to the needs of different contributor groups. Budgeting for working groups can be further segmented into quarters or seasons. Other DAOs, such as Yearn Finance, leverage a tiered compensation structure, awarding funds to individuals depending on their level of contribution. While some contributor-compensation modalities may be functionally similar to those of a traditional firm, DAOs can also employ a mechanism for token holders to remove someone from their position at any time.

BOX 5

Yearn DAO

Yearn DAO is the decentralized community formed in July 2020 to govern and operate the Yearn Finance protocol (formerly iEarn), a DeFi lending aggregation, yield generation and insurance protocol on the Ethereum blockchain. To achieve a “fair launch”, Yearn lead developer Andre Cronje passed ownership and governance of the yearn.finance suite of tools and smart contracts to the community through a token distribution to liquidity providers.

Yearn DAO is pursuing increasing levels of decentralization over time, accomplishing more decision-making transparently on-chain when operationally feasible. Yearn DAO is currently developing Governance V2 to optimize delegation, special committees, voting and other processes. The community’s description of Yearn DAO as an emergent and evolving experiment in decentralized collaboration is included in *The Blue Pill* book.¹⁵ Contributors reward each other with points that convert into governance tokens through Coordinape, a peer-allocation rewards-and-feedback tool developed by yearn.finance.

DAO contributors are compensated for their work through a variety of mechanisms. For example, Coordinape is a widely used peer-assessment platform that enables the DAO community, itself, to apportion grants and salaries to participants. Contributors use Coordinape to report their work, which is then reviewed by a group that determines what funds the contributor will earn. While some DAOs use the tool to compensate all contributors, others use it for specific contributor tiers. Other contributors are compensated for their performance in predefined roles within working groups.

DAO contributors are typically paid in native DAO tokens, stablecoins or other crypto-assets. The hybrid compensation model can incentivize contributors to continue working in the DAO,

thereby increasing the value of the native DAO token while also providing short-term liquidity in the form of a stablecoin. DAO contributors can also be compensated via grants – funding allocated to individuals who propose projects to the DAO that are approved by the grant-making body, typically a group of community-elected contributors who review grant requests and distribute resources. Bounties are automatically distributed to DAO contributors upon completion of a task, eliminating friction in typical payment processes. Furthermore, some DAOs offer full-time roles that remunerate contributors with salaries that can be paid out in stablecoins. DAOs can also institute revenue-sharing practices, where contributors are compensated according to the revenue generated by a product they create.

3

DAO governance

Governing a DAO is a complex, dynamic process. To aid this effort, DAOs use a variety of voting processes, tools and governance procedures.

In recent years, DAOs have experimented with a wide variety of governance processes aimed at enhancing their performance, while also reimagining how these organizations can incorporate more

participatory models of decision-making. Given their heterogeneous nature, DAOs will require a variety of different governance models.



3.1 DAO frameworks

Governing a DAO is a complicated, dynamic process. To aid this effort, many develop or adopt governance frameworks – rules of the road that can codify a DAO’s purpose, contributor roles and responsibilities, incentive structures and more in smart contract code.

DAO governance frameworks, or simply “DAO frameworks”, are smart contract templates that can be used to deploy a DAO on a blockchain. A DAO framework should be suited to a DAO’s vision: a function or purpose for existing, which may be expressed by a person, team or community. DAO frameworks often specify the roles of treasury multisig signers, core contributors and token holders, sometimes dividing token holders into finer gradations based on their governance powers. They may also identify smart contract protocols that are upgradable or redeployable based on a vote of one or more groups. Some DAOs may opt to use multiple frameworks.¹⁶

Many frameworks also provide a “factory contract”, which deploys copies of the templates and a web interface for interacting with the factory contract and managing the resulting DAO. DAOs deployed using these frameworks adopt the on-chain governance that is encoded into the template and, often, the off-chain governance encoded into the management interface.

The system of DAO frameworks is evolving rapidly. While some offer specialized features for governing tools such as multisig wallets, others provide general-purpose functionality.¹⁷ Broadly, DAO frameworks are becoming more modular, extensible and interoperable.¹⁸ Likewise, DAO frameworks are increasingly being developed beyond the Ethereum ecosystem on blockchains such as Solana, Polkadot and Cosmos. The table in Appendix 4 offers an overview of common DAO frameworks.

3.2 Voting processes

DAOs have different mechanisms to allow contributors to participate and vote. Certain membership levels or governance-token amounts committed in support may be required to make proposals or to vote, and there may be several stages or requirements before something is subject to a formal on-chain vote. For example, Uniswap has a six-step process: (1) initial forum post to a proposals section; (2) discussion on a community call and/or Twitter space; (3) off-chain

Snapshot “temperature check” proposal meeting a quorum requirement of tokens in support; (4) updated Snapshot proposal in response to feedback; (5) Snapshot vote meeting additional quorum requirements; (6) escalation to on-chain voting, requiring a still-higher quorum requirement. DAOs in which votes can have significant financial implications, and those with a greater range of decisions subject to voting, will likely have more extensive voting processes.

BOX 6 dYdX protocol

The dYdX protocol is a decentralized exchange built on Ethereum. dYdX allows users to exchange assets without intermediaries.

dYdX token holders can propose and vote on changes to the protocol – they receive governance powers proportionate to their total owned and delegated tokens.¹⁹

Creating a dYdX Request for Comments (DRC) is how participants can propose governance improvements. Anyone can create off-chain DRCs and participate in the discussion on improvements.

Once proposed, a DRC is posted on the relevant fora for consideration and debate. As a DRC reaches a consensus, community members holding more than 10,000 dYdX can initiate a vote off-chain. If a consensus is reached, a dYdX Improvement Proposal (DIP) can be submitted by a community member holding enough proposition power for a vote on-chain. Next, a smart contract initiates an on-chain DIP based on the result of the DIP vote off-chain. Proposals must then pass a predetermined threshold based on the type of proposal.²⁰

DAO voting processes balance efficiency and effectiveness considerations. They seek to avoid familiar problems in governance systems, such as rational apathy (where voters do not participate because it requires time and effort, but each voter has a minimal impact on outcomes) and plutocracy (a concentration of power deriving from wealth).

Token-based quorum voting is the simplest form of voting, used in many leading DAOs, including Uniswap and Compound. For a proposal to be submitted and passed, a certain number or percentage of tokens must participate.

Selecting the proper quorum requirements can be challenging. At launch, Uniswap’s governance protocol required 1% of the total token supply to vote in favour of submitting a proposal for a vote and a 4% quorum to pass the proposal in favour. The first governance vote to reduce the proposal and quorum thresholds narrowly failed to meet the quorum despite the proposal attracting the support of 98% of the votes cast. The Uniswap community later voted to reduce the proposal threshold to 2.5 million tokens (0.25% of total supply).

Over time, DAOs have developed alternative approaches to quorum thresholds. Some DAOs support the delegation of voting or proposal power to others through a representative system, while others provide greater voting power to individuals who “lock up” or stake their tokens in an escrow smart contract

for a fixed amount of time.²¹ While DAO frameworks support a wide variety of voting processes, many DAOs opt to implement complex voting practices off-chain through tools including Snapshot, Discourse and Commonwealth. This section provides an overview of a variety of voting processes leveraged by DAOs.

- **Continuous approval voting** allows new proposals to be submitted at any time, as long as they surpass the voting weight of the last successful proposal implemented. The more votes there are on the system’s current state, the more secure the system is from any “rogue” proposals. However, this can make it harder for proposals to overcome the status quo.²²
- **Optimistic governance** attempts to reduce voter fatigue by dramatically lowering the number of proposals upon which a token holder is expected to vote. This model assumes that proposals pass unless there is a strong objection, requiring a rejection threshold rather than an approval quorum. The rejection threshold is usually much lower than a typical approval quorum, meaning more voices may be heard in this process. However, this model still relies on active monitoring of proposals and adequate contestation periods to prevent problematic proposals slipping through.
- **Delegation** allows token holders to outsource decision-making and/or direct their proposing

and/or voting rights to value-aligned people or groups they trust. Delegation is similar to proxy votes in traditional finance. Delegates can be individuals or other DAOs.

- Many DAOs elect **councils** or **committees** as trusted token-holder representatives. These representatives act as a quasi-board of directors, often elected via a decentralized election process that lacks authority to act without input and support from the broader community. They may be elected on a regular basis or by fulfilling a delegation threshold that runs on a rolling basis. Some representatives step in to vote on proposals only when token holders fail to reach a quorum.

Since each council or committee member usually has only one vote, the tendency towards plutocratic decision-making is also reduced. Representatives abusing their position may be removed by token-holder vote.

- Several protocols are moving towards NFT-based voting that moves away from a one-token, one-vote paradigm towards a one-person, one-vote model. **NFT-based voting** may mitigate the risk of plutocracy common to token-weighted voting that has been well outlined by Vitalik Buterin.²³ DAOs experimenting with NFT-based voting include Optimism, Element Finance and Marinade Finance.

BOX 7 Optimism Collective

Founded in 2022, the Optimism Collective is a DAO designed to develop incentive models to encourage the development of public goods. Optimism uses a bicameral approach to DAO governance. The token house, constituted by all OP token holders, determines protocol incentives and upgrades. The citizens' house, composed of non-transferable token holders, is responsible for the funding of public

goods. This division of labour seeks to optimize the entity by taking advantage of specialization.

The Optimism Foundation is a non-profit focused on growing the collective; it has pledged to donate all profits from Optimism's core sequencer to the development of public goods elected by the collective's citizens' house.²⁴

- **Quadratic voting** is another method that attempts to reduce the tendency towards plutocracy and is employed by Gitcoin DAO. Votes are counted according to their square root, so 100 different token holders voting one token for a proposal will have greater weight than one large holder casting 200 tokens. Quadratic voting systems must address the challenge of Sybil attacks, whereby one actor simply splits their tokens between multiple wallets.

Given the challenges outlined above, an increasing number of protocols are trending towards governance minimization or limiting the number of decisions to be made by humans, often via automation at the technical layer. This results in a streamlined governance system, but the more automated governance becomes, the less adaptive the protocol will be, and it is unclear how these protocols will stand the test of time as parameters ossify. The table in Appendix 3 summarizes voting procedures that can be used to address various DAO governance challenges.



4

Legal structures

DAOs today confront a fragmented and uncertain regulatory landscape.

The legal and regulatory questions raised by DAOs fall into two primary categories: the legal structure of the DAO itself, and how regulators and policy-makers might view the activities in which a DAO engages. The available legal options,

and the regulatory responses, will depend on the jurisdiction. In addition, while this section is accurate at the time of publication, the legal environment for DAOs is subject to rapid legislative and regulatory developments.



4.1 The need for legal formalization

A DAO may be wrapped in a formal entity structure that is explicitly established to define its legal treatment. That entity may use an established legal form or, in some jurisdictions, bespoke arrangements created specifically for DAOs. Both options are discussed in this section, without taking a position on the best approach for any particular DAO.²⁵

The primary reason to establish a legal wrapper is to provide a set of useful, or even necessary, legal rights. One of the most important is limited liability, under which participants are responsible at most for their own investment. A legal entity can also enter into contracts, own property, have employees, pay taxes and sue in its own name. If a DAO lacks a legal wrapper, these functions must either be done by individual participants or by some associated legal entity, such as a corporation that performs the initial development work.

However, establishing a legal wrapper has costs, both financial and in terms of the restrictions it imposes. Wrappers needing registration may require the advice of legal counsel in the relevant jurisdictions, although the registration itself is

typically inexpensive. Some DAO participants may find registration with a government agency inconsistent with decentralization or their desire for pseudonymity. In the US, for example, under the Corporate Transparency Act (CTA) adopted in 2020, entities registering with states or formed under the law of a foreign country and registered to do business in the US will be required to report beneficial ownership information on an initial and ongoing basis to the Financial Crimes Enforcement Network (FinCEN) of the Treasury Department.²⁶ This requirement may be impossible for some DAOs, such as those with pseudonymous members, to meet.

Even if a DAO does not explicitly create a legal wrapper, it may be recognized by default under the law as an unincorporated association or a partnership.²⁷ Alternatively, courts may directly evaluate its legal status. Although rare, courts also have the option to “pierce the corporate veil” and hold participants personally liable even when legal formalities exist, although this remedy is generally used only when the entity structure is somehow improper.

Regulators may act where a DAO appears to have been established as a means of evading legal oversight. In a recent enforcement action, the US Commodity Futures Trading Commission (CFTC) sanctioned bZeroX and its two founders for improperly offering unregistered margin trading in digital-asset commodities. More controversially, the CFTC also sanctioned Ooki DAO, which it concluded was an unincorporated association operating as a successor to bZeroX, engaging in identical activities with active participation from the same founders. The order suggested that any participant in Ooki DAO governance could be held responsible, raising questions about the scope of contributor liability.²⁸ Whether the CFTC will follow through, and whether other regulators will take a similar approach, remains to be seen. Some legal rights have blockchain-based analogues. For example, a smart contract can execute and enforce

agreements. However, while smart contracts may offer the benefits of decentralization and immutability, they also have significant limitations compared to legal contracts.²⁹ Furthermore, if a development corporation establishes a DAO, the absence of a recognized legal entity may make it difficult to transition control of functions to the DAO community, and regulators may use the commingling of activities as a basis to treat the corporation as the legally responsible actor.

A DAO may also be associated with more than one legal entity. A legal wrapper may apply to a subset of the DAO's activities. For example, one entity may be responsible for issuing tokens, another for managing the DAO's treasury, another for legal engagements with centralized service providers and another for engaging in stewardship of the DAO or protocol.

4.2 Traditional legal wrappers

Several legal wrappers are available to DAOs. Each legal entity structure provides a different set of trade-offs. The right approach for a DAO depends on its particular mission, community, size, stage of development and other factors. The law is also evolving as jurisdictions adopt new DAO-oriented structures, while courts and regulators evaluate DAOs under traditional ones.

The most prominent traditional legal forms are corporations, LLCs and partnerships. For each, specifics of formation, governance, taxation and other attributes vary from country to country and within countries such as the US whose corporate-law regimes are primarily subnational.

A **corporation** is a for-profit or non-profit legal structure in which ownership (shareholders) is separated from operation (managers). The corporation is treated as a legal person for various activities such as contracting and litigation. And to guard against potential misalignment between shareholders and managers, a variety of corporate-governance obligations apply. The registration, governance and tax requirements of traditional corporations are a poor fit for DAOs because they presume centralized management and equity shareholders.

LLCs (limited liability companies) were first established in Wyoming in 1977 to offer many of the legal benefits of corporations with significantly more formal requirements. An LLC need not have a board but can be structured however the parties see fit. This flexibility has led LLCs to be adopted as a favoured structure for many novel organizations, including DAOs with a significant US nexus.³⁰ However, the beneficial-ownership disclosure requirements of the CTA pose a challenge for some DAO LLCs.

A **partnership** is a structure in which participants jointly engage in business activities, sharing in the profits and losses. The unlimited liability and inflexibility of partnerships are generally inconsistent with the operations and objectives of DAOs.

Other recognized legal forms include **foundations**, which may be private entities or public charities established for some public interest purpose; **associations**, a broader classification for groups seeking to achieve a common objective; **trusts**, which must act for the benefit of their principals; and **cooperatives**, which are owned by active participants or customers. Each has attributes that dovetail well with DAOs.

In many US states, an unincorporated non-profit association (UNA) may be formed without formal registration, offering many of the benefits of other legal wrappers.³¹ In particular, the UNA can provide limited liability and beneficial tax treatment for participants, if properly constituted. The “non-profit” restriction does not prevent members from receiving financial benefits, so long as the organization's activities are structured to preserve an overall non-profit purpose.

A number of DAOs are constituted as **ownerless foundations** under the laws of Switzerland, the Cayman Islands (“foundation company”) and the Netherlands (“Stichting”). The Swiss foundation structure has been prominent in the digital-asset world since it was adopted by the Ethereum Foundation. These structures, unlike US-based foundations, do not require the identification of shareholders, managers or beneficial owners and have relatively limited requirements that can be adapted to DAOs. The Swiss foundation structure potentially offers more flexibility in governance. The law firm MME, which represents many digital-asset

projects, has developed a model framework for decentralized autonomous associations (DAAs) based on this legal category.³²

A final relevant form is the **trust**, which acts on behalf of beneficiaries. Purpose trusts in Guernsey allow for designated trustees to act in the interests of a trust under a written agreement, but the trustees' liability is limited to the assets under their control, and token holders are shielded from further legal obligations.³³

The trust is used to wrap specific committees or sub-DAOs engaged in functions such as the allocation of funds, rather than the entire entity. The arrangement may provide clarity in tax treatment and allow the DAO to engage in activities such as opening a bank account or signing agreements as for a corporation. However, many European countries do not recognize trust companies, creating an unclear and risky tax dynamic.

BOX 8 Tribute Labs DAO

Tribute Labs developed an approach using ordinary Delaware LLC entities as a legal wrapper. The LAO serves as a member-governed, member-owned venture-capital fund wherein members pool capital, invest in Ethereum projects and share in the returns of their investments. In addition to its smart contracts, the LAO is governed by an operating agreement, as is required of all registered LLCs.

The LAO's creators believe that the Delaware LLC wrapper has provided the LAO and its members with many significant operational benefits, including: 1) insulation of member personal liability for non-contributed assets; 2) the capacity for the LAO to contractually acquire property, both physical and intellectual; and 3) clarity over core issues such as dispute resolution and smart-contract supremacy over other governing

agreements (an operating agreement, for example). With respect to taxation, the LLC structure equips the LAO's membership with the flexibility to choose default pass-through taxation or corporate taxation at the entity level. Yet questions remain – for example, whether the US Securities and Exchange Commission (SEC) would consider general-membership interests in a member-managed DAO LLC, such as the LAO, as securities. In order to mitigate risks, given this regulatory uncertainty, the LAO limits its membership to 99 investors, all of whom must be accredited investors.

Other Delaware LLC DAOs supported by Tribute Labs include NFT collective Flamingo DAO, DeFi liquidity provider Neptune DAO and play-to-earn gaming platform Ready Player DAO.

4.3 Bespoke legislative frameworks

The alternative to adapting existing legal forms is to use new legal frameworks designed specifically for DAOs. Some of these have already been adopted.

Malta – The first nation to formally recognize the distinct legal personhood (i.e. the basic ability of a legal organization to take legally binding actions or have legally binding relationships) of DAOs was Malta, through legislation introduced in 2018. However, formation of DAOs under Maltese law has been limited due to concerns about excessive complexity and centralized requirements.

DAO LLCs – Wyoming, Tennessee and Vermont have established specialized LLC forms designed for decentralized organizations such as DAOs.³⁴ Although there are differences among the three regimes, each state: 1) requires a DAO LLC to establish and maintain a registered agent within the state; 2) contemplates and permits blockchain-based automated DAO governance; and, most importantly, 3) confers limited liability on DAO members for the debts and obligations of the DAO entity.³⁵ The Republic of the Marshall Islands has also adopted legislation allowing DAOs to register as non-profit LLCs.

Colorado LCAs – In Colorado, DAOs can formally register as limited cooperative associations (LCAs). Colorado's LCA modernizes the cooperative model by blending its core tenets with elements of the LLC and corporate form.³⁶ The LCA provides significant flexibility in profit distribution and voting mechanisms. However, because the LCA is a form of corporation, it relies on a board of directors and requires a registered agent in the state, which may not be appropriate for certain DAOs. The Colorado law also lacks explicit guidance regarding governance by smart contract.

COALA model law – The Coalition of Automated Legal Applications, a global blockchain think tank, has developed a proposed regulatory framework for legally recognizing DAOs.³⁷ The model law grants DAOs significant flexibility to structure and govern themselves as desired, and addresses specific blockchain-based phenomena – contentious forks, DAO restructurings and failure events – that have governance implications for DAOs.

Table 1 identifies the significant attributes of each of the identified legal structures.³⁸

TABLE 1 | Legal structures

Legal structures	Properties
Entityless	<ul style="list-style-type: none"> – May not be entitled to legal benefits (limited liability, corporate personhood) – Avoids need for registration but may be subject to default treatment
Corporations	<ul style="list-style-type: none"> – Governance requirements, equity shareholders and centralized management unsuitable for DAOs
Partnerships	<ul style="list-style-type: none"> – Unlimited liability and inflexibility unsuitable for DAOs
DAO-friendly traditional legal structures	<ul style="list-style-type: none"> – Each structure has advantages and limitations for different kinds of DAO – May provide for legal benefits and clarity on tax treatment – Anonymity may be difficult or impossible with forms requiring registration
Bespoke legal structures	<ul style="list-style-type: none"> – Designed with DAOs in mind to allow for decentralization – Each structure still has advantages and limitations for different kinds of DAO – Adoption has been relatively limited so far

4.4 Implications of legal structures

The legal structure of a DAO has important regulatory impacts beyond corporate-law considerations.

Securities law. Tokens issued for investment purposes may be classified as securities or equivalent financial instruments, which would subject them to significant regulatory obligations and limitations in many jurisdictions. Classification under securities law has been a major point of debate and regulatory enforcement for token issuers and exchanges since at least 2017. The question is also highly relevant for DAOs.

In a report issued after The DAO shut down, the SEC concluded that its tokens were securities that had been issued without meeting the applicable registration requirements or exemptions. Had the DAO remained in operation, those responsible for its token issuance or operation might have been subject to fines or other sanctions. In addition, under SEC rules, DAOs that issue securities could be considered “reporting companies” required to meet ongoing disclosure requirements detailing material changes in the financial condition or operations of the issuer. Some investment-oriented DAOs limit the number of participants in order to fit within registration exemptions under SEC rules.

In the US, whether token issuances are investment contracts subject to securities classification falls back to the Howey Test: whether an investment contract exists if there is an “investment of money in a common enterprise with a reasonable expectation of profits to be derived from the efforts of others”.³⁹ In the European Union, the second Markets in Financial Instruments Directive (MiFID II) defines the scope of securities offerings, while the Markets in Crypto Assets (MiCA) directive, now in the process of adoption, establishes requirements for tokens that do not qualify as securities. Civil-law jurisdictions tend to define securities based on similarity to traditional instruments such as stocks and bonds.

Tokens associated with DAOs are often not expressly issued as the investment instruments. Instead, they are defined as governance tokens, and the tokens grant holders the right to vote on attributes of the DAO. However, those tokens may also be traded on secondary markets for investment purposes, raising the question of whether they should be classified as securities. Even if a token has utility functionality, the SEC has made it clear that it remains a security under US law if the Howey attributes are present. Some other jurisdictions, such as Switzerland and Singapore, formally distinguish categories such as payment and utility tokens from security tokens.

The circumstances of creation, structure and functioning of a DAO may influence whether it raises concerns under securities laws. While this is an evolving area with limited case law, the more the functionality of the DAO as an operating organization predominates over speculative investment activity in the token, the more likely the DAO will be considered compliant. Similarly, the more that governance tokens are actually used for governance, the less likely it is that they will be considered securities.

DAOs engaged in financial activity may be subject to other aspects of financial regulation beyond securities laws. For example, Ooki DAO was charged by the CFTC for violation of US commodities laws, which restrict the provision of margined trading services for commodities.

Taxation. Throughout its life cycle, a DAO will engage in several key activities that implicate tax issues. A DAO may begin its existence with a transfer of tokens from a more traditional corporate entity that developed a core protocol before turning over future development and control to the DAO. A DAO and its members may at some point pursue a treasury-diversification programme – selling native governance tokens for other digital assets or fiat currency in order to fund future development or simply to hedge against volatility of the DAO's native token.⁴⁰ Depending on the type of DAO, it may realize income or returns from its activities. For example, investment DAOs may see gains or losses on their portfolio, collector DAOs may see the value of their art or NFT holdings appreciate, and DAOs that participate in staking may be deemed to collect income. Finally, DAOs – and particularly protocol-development DAOs – often establish grant programmes to fund teams supporting the general protocol infrastructure. Some even do so as their sole reason for existence. One of the major reasons to adopt a legal wrapper or bespoke legal framework for a DAO is to avoid the tax implications of classification as a general partnership.

There is currently no internationally agreed position on how to treat DAOs for tax purposes, nor is there clarity domestically in most jurisdictions. The lack of an international tax framework for DAOs leaves room for the implementation of different DAO legislation by countries. This may create mismatches, and potential double (non-) taxation and tax risks and liabilities, which implies uncertainty for both the taxpayer and the tax authorities. Moreover, a DAO's legal wrapper may be incorporated in country A, but from a tax perspective its commercial activities (and profits) may be allocated to country B (and perhaps country C as well). These profit allocation-related queries are not uncommon for any company operating in an international environment, but they seem to become more complicated when applied to DAOs.

Several initiatives across the globe, including the tax-reporting requirements in the US Infrastructure Bill that will come into effect on 1 January 2023 as well

as the Crypto-Asset Reporting Framework (CARF) proposed by the OECD, will require exchanges and other virtual-asset service providers (VASPs) to report crypto-transactions to the respective tax administrations. This raises the question of when a DAO might be considered a VASP.

Holders of digital assets are generally already subject to income tax rules in the country in which the token holder resides. That said, underreporting of income related to digital assets remains a key attention point from a tax-enforcement perspective. When a person participates in a DAO and receives (governance) tokens in return, the default starting position may be that these tokens are not taxed differently from any other digital assets for income tax purposes. This implies that any capital gains and losses may be taxable and that any income generated from these tokens (e.g. airdrops) may, in principle, also be subject to taxation. Things may become even more challenging if a person contributes to the DAO – for example, by developing software to enhance the capabilities of the DAO – and receives new tokens in return; such income might be taxable as income derived from business/entrepreneurial activities or as a form of in-kind salary.

In addition to the taxation of governance tokens and their holders, the activities pertaining to the DAO treasury become relevant. Very often DAOs have a treasury of funds that can be allocated to various investments (in DeFi protocols, for example) that generate income. If these activities include participating in staking, lending or mining, or any other disposition of tokens, this may already result in the recognition of capital gains or losses for the respective token holders. Here it becomes relevant that all token holders are aware that these potentially taxable transactions have occurred in the first place, let alone that they are properly reported for income tax purposes. Considering that value may be embedded in the token itself, this may create liquidity issues for the taxpayer.

The administrability and enforcement of DAO tax laws is a challenging matter. Few tax administrations are willing to accept payment in digital assets today, let alone allow a protocol to collect tax receipts from digital-asset activity and forward those receipts to a tax administration. It may be difficult for both taxpayers and authorities to determine whether individuals and entities have properly self-reported taxable income.

Employment and labour law. The idea of operating a business without any central governance has become especially intriguing to bricks-and-mortar companies struggling to provide fair rights for workers. However, there is still no clear guidance on people who are paid to do work for DAOs, employee benefits, social security and (in the case of physical DAOs) whether there are worker-compensation issues as well. There is also the question of whether DAOs can replace unions.

Insurance. Smart contract failures or exploits could result in real-world losses to users, and recipients of DAO treasury grants could act and do harm in the real world with the funds they receive. While there are virtual-world solutions for the first example (such as safety modules and on-chain insurance), these solutions can be difficult to implement and may result in downward price pressure on a project's tokens if the insurance ever needs to be paid out. There are no on-chain insurance solutions yet for the actions of DAO actors in the real world. As a result, DAOs may need traditional insurance, including general-liability policies. In addition to covering potential losses, these policies could also help to protect the limited liability that DAOs may obtain through legal existence.

Further, as even the simplest DAOs will likely require a small number of people to administer their affairs (such as community management and social media), DAOs need to be able to provide employees with employment benefits, including health, dental and life insurance, at least in systems like that of the US, where employers typically provide these benefits. Without such benefits, DAOs may be unable to attract talent, which could hinder their ability to act independently from the developer corporations that launched them. In addition, failure to provide benefits to employees leaves DAOs exposed to allegations that they are ultimately worse for employees than traditional corporate structures, which could threaten their political viability.

While there are insurance providers willing to underwrite general-liability policies for DAOs, there are few, if any, that are willing to provide employment benefits to DAOs that use non-traditional structures (structures other than a corporation or LLC). Even if insurance is available, a lack of legal existence for DAOs remains a significant impediment to the creation of legal relationships between DAOs and insurers.

Banking. While web3 offers several alternatives to traditional banking, many DAOs would benefit from setting up and maintaining a bank account. First, a bank account could be used to capitalize a DAO, thereby safeguarding the limited-liability protections that a DAO might obtain through the achievement of legal existence. Second, a bank account could facilitate the payment of taxes, employee wages and insurance premiums. Third, even in cases where a DAO might make use of an employee-of-record service instead of hiring employees directly, such services often require their counterparties to maintain bank accounts. There are few, if any, established banks that are willing to commence banking relationships with DAOs that use non-traditional structures (structures other than a corporation or LLC). Even if a bank is willing to engage with a DAO, a lack of legal existence for DAOs remains a significant impediment to the commencement of such relationships.

Anti-money laundering (AML) and countering the financing of terrorism (CFT). Regulators have historically relied on financial intermediaries, such as banks, to protect against illicit finance risks. DAO treasuries are most often stored in unhosted multisig wallets beyond the ambit of centralized financial intermediaries, which may interfere with regulatory schema because they are not controlled by an identifiable third party. Financial regulatory bodies such as the US FinCEN and international standard-setter Financial Action Task Force (FATF) have, in recent years, imposed AML/CFT requirements on virtual-asset service providers, which, in some cases, may include obligations related to unhosted wallets. Developments in this area will have a significant impact on DAOs.

A related issue is the enforcement of sanctions, such as the US Office of Foreign Assets Control (OFAC) regime. In August 2022, OFAC issued sanctions against Tornado Cash, a digital-asset mixer that had been used by sanctioned entities such as the government of North Korea to launder stolen funds. The mixer itself is not a DAO; it is a set of immutable smart contracts. However, there was a Tornado Cash DAO associated with the project, which went dark a few days after the sanctions were announced. The implications of OFAC listing (which prohibits any interaction with sanctioned persons or entities) on decentralized systems is the subject of a great deal of discussion.

Governance. The form of entity that an organization chooses, or which the law assigns it, raises many issues about the internal legal governance of the organization. Internal legal governance addresses questions such as: the basic ability of a legal organization to take legally binding actions or have legally binding relationships (often called "legal personhood"); who controls and has the power to act legally for the organization (often treated in common-law countries as a question of legal "agency"); how the organization terminates its legal affairs, and so on. These questions are distinct from questions of external regulation – statutes or administrative rules that prohibit certain types of marketing to individuals or require registration of securities offerings, for example.

The law is only beginning to address how more complex features of organizational law apply to DAOs. For example, legal questions may arise (but have no clear answer under present law) concerning the disputed legal control of DAOs and legal attributions of a DAO's actions. As with other types of organization, legal registration and the drafting of operating agreements enables parties to provide legal clarity in advance of potential disputes. For example, an operating agreement can clarify what is to happen in the event of unusual technical or financial circumstances, new regulations or disputed off-chain governance.

5

Recommendations

As DAOs engage with a variety of challenges, many are pioneering new operational, governance, legal and policy strategies.

The operational, governance and legal needs of a DAO depend on factors including community size, composition and goals. This section provides a brief overview of recommendations for DAOs in operational, governance and legal areas. It also provides approaches to developing legal and regulatory frameworks for DAOs. The intention

is not to provide any prescriptive solutions but to raise key considerations for developers, policy-makers and others engaging with DAOs. No section is exhaustive; instead, each is intended to offer general-purpose, modular tools for DAO developers and policy-makers.



5.1 Operational

The right operational strategies, processes and tools for a DAO will depend on its size, community and purpose. Here we provide a summary of different operational strategies that DAOs can employ. While not comprehensive, it offers a starting point for DAOs to develop effective operational strategies.

Crucially, before developing a DAO, a group should consider whether it is the right structure to achieve its goals. If a group decides to create a DAO, then developing and publishing goals can help DAOs operate effectively. A clear mission and vision enable DAO contributors to align their individual work with the shared goal of the community. DAOs may consider employing progressive decentralization, where a centralized group manages certain tasks and then transfers control to a community. If a DAO opts for this path, it should carefully assess the legal implications of how control is transferred. Publishing their mission

and vision may allow DAOs to enhance contributor engagement; outside feedback on their mission and vision can also enable DAOs to refine their purpose.

For some DAOs, employing effective administrative practices can enhance operations. Defining a clear recruitment strategy can help optimize community development and engagement. Onboarding processes may help new members understand the DAO's goals and how they can contribute. Developing educational materials and facilitating connections between new and old contributors can improve onboarding. New-member onboarding may be facilitated by a dedicated working group tasked with training new participants and facilitating relevant connections. Empowering local "ambassadors" or community managers with specialized knowledge of a DAO community can help facilitate onboarding and other key operational processes. Likewise, DAOs can consider using non-transferrable tokens to mitigate the risk of

fraudulent identities and streamline onboarding processes. DAOs may also consider developing formalized roles for different contributors, making work opportunities clearer and enabling skills development for contributors to increase talent retention. Similarly, DAOs can proactively develop offboarding processes to mitigate scaling challenges. While all of these strategies can help a DAO manage its operational processes, a group should consider whether alternative forms of organization may be better suited to an endeavour requiring significant administrative processes.

Depending on its purpose, a DAO may benefit from brief sprints, or seasons, to direct contributors to a series of tangible, measurable objectives over a short period of time. Seasons can be focused on a single topic or theme that aligns with the DAO's goals. Communities can also pre-establish times in which to reflect on the success of past seasons and plan future seasons. Likewise, goal-setting and accountability processes can be used to enhance contributor accountability.

Division of labour may help DAOs operate effectively. Working groups tasked with specific mandates can lessen operational burdens, especially for tasks requiring specialized expertise. For example, a technical working group can be

tasked with testing the scalability and viability of DAO infrastructure. The creation of materials detailing the responsibility of each working group can help new members determine which working groups they can join and how to do so. Communities may consider the development of review committees devoted to specific tasks with relevant expertise to facilitate work product review.

Defining and developing appropriate membership and compensation practices can also help DAOs operate. DAOs can consider setting minimum and maximum membership fees. Some DAOs may benefit from a tiered approach to compensation, in which contributors are compensated according to the type of work they do. Different forms of compensation such as grants, bounties, revenue-sharing practices and salaries can be employed to incentivize contributors. DAOs may consider a lock-up period for compensation to encourage contributors to participate over the long term. DAOs may also benefit from reimbursing delegates for expenses, which could open up participation to a broader range of contributors. Likewise, paying delegates and active community members can enable DAOs to foster greater participation. Sharing information across the ecosystem can help DAOs benchmark compensation practices.

5.2 Governance

“Good governance” is not easily defined for communities whose value lies in self-determination via self-governance. Each community must try to define good governance for itself. The section below summarizes some areas in which DAOs are beginning to define effective governance practices.

Ensuring inclusive discussion and respectful discourse can help increase engagement in governance practices. DAOs may consider appointing administrators or moderators to remove proposals that appear to be fraudulent, spam-oriented, defamatory, hateful or otherwise inappropriate. Moderators can also help manage mutually contradictory proposals that are submitted simultaneously.

Effective community governance depends on establishing and maintaining strong voting practices. Communities may benefit from defining and releasing voting-rights practices that answer basic questions such as who needs to vote on what and how they can do so across voting periods. DAOs can also define processes that describe what constitutes a “yes” or “no” vote. A variety of voting processes can be employed to optimize DAOs for different ends. For example, the use of one-member, one-vote practices can mitigate the risk of plutocracy in DAOs. Likewise, DAOs can add timelocks for governance decisions, creating

a gap between decision and execution to enable the community to provide additional input and to adapt. These systems may benefit from verifying or qualifying contributors using NFTs or other authentication modalities. DAOs can also make use of a representative, or counsel-based-leadership approach to voting. They may also benefit from establishing “communities of practice” with cross-DAO experience to provide guidance on processes such as voting practices.

DAOs may also benefit from standardizing governance processes. For example, once proposals have been posted publicly, DAOs may mandate that there be a reasonable period to review and comment before a proposal moves to a vote.⁴¹ Furthermore, DAOs can use a process to ensure that proposals are submitted and voted upon in a valid way.⁴² Voting requirements and processes can be standardized across chains, so that the process is not more or less onerous on one chain than another.

Accessible, timely and widely distributed documentation and communication is critical for lowering the barrier to participation for new entrants. Governance is typically encoded in a DAO's governance framework and then enforced through social and technical mechanisms for accountability.⁴³ In addition, some protocols have

acknowledged a need for easy-to-digest summaries of more complex proposals. Standardized templates for different types of proposal can help voters more easily interpret information and make better-informed decisions. Governance can also benefit from building and maintaining accountability through clearly documented processes. Voter guides for delegates and open-source frameworks for delegates are crucial to ensuring a culture of accountability within DAOs. Conflict-of-interest disclosure policies may also be used to provide accountability for community members. Likewise, steward report cards (as used by Gitcoin) can build accountability into DAO leadership roles.

DAOs can also develop checks and balances to prevent governance attacks, such as the enactment of a malicious proposal that passes the approval process. ProtocolDAO (Synthetix) serves such a purpose. If a ruinous governance decision succeeds and can no longer be opposed inside the protocol, DAOs may include a provision that users have the option to fork. DAOs can develop subgroups to perform functions such as reviewing tokenomics to determine whether incentives are aligned with the goals of a DAO.⁴⁴



5.3 Legal and policy

The right legal strategy for a DAO depends on factors including its stage of development, community and purpose. Beyond developing an effective legal strategy for a given DAO, there is also the larger question of how to build fit-for-purpose policy and legal frameworks that close the existing gaps affecting DAOs generally. This section offers a starting point for DAOs to develop legal strategies and for developers, policy-makers and others to engage in the process of crafting appropriate legal and policy frameworks.

In developing an effective legal strategy, DAOs can benefit from following a clear, structured process informed by consultation with experienced counsel. Although dependent on jurisdiction, DAOs generally should consider their structure and the activities in which they engage. Based on their analysis, they should then examine the advantages and disadvantages of establishing a formal legal structure. While legal structures may provide operational advantages and enable DAOs to benefit from useful legal rights, including limited liability, they also come with costs. If a DAO decides to employ a legal wrapper, it should consider the variety of wrappers available, both traditional and bespoke, evaluating them according to the DAO's purpose, community, composition and other factors. The right legal structure for any DAO will depend on several considerations. Many resources exist to help DAOs navigate this process.⁴⁵ While this section identifies the main approaches that DAOs are currently taking, note that uncertainties remain about regulatory and tax treatment in many jurisdictions. In deciding whether to use a legal wrapper, a DAO should carefully review the laws and regulations of its specific jurisdiction with the guidance of counsel. Furthermore, a DAO should consider the implications of a given legal structure beyond corporate law, such as securities law and AML compliance.

In addition to crafting a functional legal strategy for a DAO, there is also the question of how to develop policy and legal frameworks for DAOs. The lack of alignment internationally among policy-makers and regulators on how to treat DAOs for tax purposes, for example, creates uncertainties both for taxpayers and tax authorities. Creating adequate policy and legal frameworks for DAOs is crucial to realizing the benefits and mitigating the risks of this novel organizational form. The creation of such regimes is complicated by the existence of several proposals, such as the Crypto-Asset Reporting Framework proposed by the Organisation for Economic Co-operation and Development and the US Infrastructure Bill, which could create competing requirements for DAOs.

In developing a clear, harmonized approach to DAO law and policy, collaboration across the public and private sectors is essential. To initiate this process, policy-makers, developers and others can engage in an open, collaborative dialogue as part of a structured process. The first step is to identify the major goals of policy and regulation for DAOs. While consumer protection may be the overarching policy goal in one jurisdiction, another may favour fostering innovation, while others still may seek to realize both. As elaborated in Section 4 legal and policy considerations for DAOs span multiple regulatory areas including securities law, taxation and employment and labour law. Thus, a coherent overall strategy is crucial to developing effective policy regimes.

Once policy-makers have identified their goals, they may find utility in a variety of transitional mechanisms such as the development of specialized regulatory units, purpose-specific disclosure requirements and regulatory sandboxes. These methods have been elaborated in a previous publication from this collaboration, the [Decentralized Finance Policy-Maker Toolkit](#). Generally, policy approaches to DAOs may benefit from considering the dynamic nature of DAO development and decentralization; DAOs that begin as largely centralized efforts among a group of core developers may opt to decentralize progressively.

Likewise, policy-makers may find value in a technology-neutral approach capable of balancing policy goals with promoting innovation. They should exercise care to adopt practices such as identifying legally responsible parties in ways that recognize the functional realities of DAOs. As discussed throughout this report, actors in a DAO may have different levels of engagement, power and awareness with regard to the DAO's activities, based on its operational arrangements and governance mechanisms. How to craft policy and legal frameworks for DAOs that are just, effective and enforceable will be a question for different jurisdictions to consider according to their needs. To facilitate this process the report provided a summary of the major legal and regulatory questions facing DAOs as well as a set of tools in the appendices to help evaluate DAOs.

Conclusion

DAOs are engaged in nothing less than an experiment to reimagine how we all connect, collaborate and create.

Combining recent technological innovations with community efforts, DAOs have the potential to address many of the shortcomings of the traditional firm while also realizing more equitable governance and operations. Their code-driven, community-oriented nature may enable them to effect new models of allocation and coordination, revolutionizing use cases as diverse as financial services and philanthropy. Yet they also confront significant operational, technical and governance hurdles. Perhaps most acutely, DAOs today are confronted by a fragmented and uncertain landscape of law and regulation.

Rather than provide a complete analysis of the DAO ecosystem, this report has offered a set of resources to help developers, policy-makers and others effectively evaluate and engage with DAOs. It has explained what DAOs are and how they are operationally distinct from traditional organizations

and discussed the opportunities and challenges they create. It has offered an analysis of DAO governance processes, challenges and mitigation strategies, while providing an overview of the major legal and regulatory questions with which DAOs must engage. The report has concluded with recommendations for DAO operations, governance and policy. In the following appendices, it offers a set of tools to help evaluate and govern DAOs.

Like the rest of web3, DAOs are a novel and emergent phenomenon. In less than a decade, they have gone from theory to practice, mushrooming across sectors. While proponents project the continued and rapid expansion of DAOs, critics view them as ephemeral. Only time will reveal the results of the DAO experiment, demonstrating if, when and how DAOs will ultimately have their greatest impact.



Appendix 1: DAO typology assessment

The following questions are designed to help evaluate the types of DAO. Critically, these dimensions may not be static and should be evaluated on an ongoing basis.

- What is the DAO's objective? Refer to its founding documents to determine the stated objective of the entity.
- Is this primary objective generative? Does it seek to create something or perform an ongoing function? Generative DAOs perform functions such as supporting networks or applications, facilitating participant investment activity and compensating people for performing work.
- Is the primary objective associative? Does it seek to enhance the functioning of a community or society? Associative DAOs facilitate on-chain management of a community, fund public goods, networking and coordination.
- Is the primary objective ad hoc? Does it seek to achieve a specific goal and then disband? Ad hoc DAOs can pursue specific communal

objectives, buy a unique item or entity or facilitate group coordination at a specific time and/or place.

- Once the DAO's objective has been determined, it is then important to establish its means: how does it plan to achieve that objective?
- Is the DAO's primary means managing an activity? Activity DAOs operate by powering a network or application, managing communities or pursuing a specific communal objective.
- Is the DAO's primary means deploying capital? Value-transfer DAOs use investment, philanthropic activities and acquisition strategies to achieve their objective.
- Is the DAO's primary means organizing people? Social DAOs compensate contributors and facilitate networking and coordination.

Once both the DAO's objective and means have been determined, it can be located on the grid below – blue text is used to show the type of DAO.

		OBJECTIVE		
		Generative	Associative	Ad hoc
Means	Activity	Functional <i>(Power a network or application)</i> Bitcoin, Ethereum, Tezos, Avalanche	Governance <i>(On-chain management of a community)</i> Uniswap, Yearn, ENS, Steem.DAO, Illuvium, Sandbox	Task <i>(Pursue a specific communal objective)</i> UkraineDAO
	Value transfer	Investment <i>(Facilitate participant investment activity)</i> MetaCartel, Olympus Pro, PleasrDAO, Flamingo DAO, Whale, CityDAO	Philanthropic <i>(Fund public goods)</i> GitcoinDAO, MolochDAO, EduDAO, KlimaDAO, LeXpunk	Special Purpose Acquisition DAO (SPAD) <i>(Buy a unique item or other companies/DAOs)</i> ConstitutionDAO, SpiceDAO
	Social	Production <i>(Compensate people for work they do)</i> dOrg, HumanDAO, Yield Guild Games, Mirror, MODA, Audius, Nouns, Squiggle	Community <i>(Networking and coordination)</i> Friends with Benefits, Bored Ape Yacht Club, LexDAO, Bankless	Flashmob <i>(People come together at a place and/or time)</i>

Appendix 2: DAO governance assessment

The following questions are designed to help evaluate the governance model of a DAO. Critically, these dimensions may not be static and should be evaluated regularly.

- Is there a resource articulating a governance model?
- If not, has the project communicated its ambition to develop one?

Assess the voting process:

- On which platform does voting take place?
- Who can vote? All users, all token holders, only governance token holders or NFT token holders?
- Who can propose a change in governance, and is there a threshold?
- How are changes proposed?
- Can proposals be submitted at any time?
- Do members have to actively monitor proposals?
- Are proposals automatically accepted if they are not rejected?
- Can voting be delegated?
- Can voters elect representatives?
- Do token holders have the opportunity to stake their tokens in support of a proposal?
- Can governance tokens be traded?

Depending on the answers, the DAO may be employing any/several of a wide range of the voting processes elaborated in Section 3.2. For example, the DAO may be using token-based quorum voting with or without conviction-based voting or continuous approval voting. In addition, it should be able to identify whether the voting process is one of delegation or representation, employing optimistic governance or not.

With what has been established above, the following questions provide a solid foundation for understanding the DAO's degree of decentralization:

- What type of blockchain is the DAO running on? How many nodes are operating on the network?
- How many members does the DAO have? How many members are contributors and to what degree are the DAO contributors separated geographically?
- How is it decided which aspects of the system can be altered by governance token holders?
- Who holds the administrator keys?
- How are changes implemented? Is there an individual or group in charge of implementing changes? Or are changes implemented automatically by smart contract execution?
- How equitable is the distribution of resources in the DAO? Does an individual or minority control the majority of resources?

Depending on the answers to the above questions, a DAO may be completely centralized, partly decentralized or fully decentralized.

Determine how autonomous the DAO is. The following questions provide a solid foundation for understanding how automatic the design is:

- Are changes implemented automatically by smart contracts?
- If so, who can alter the smart contracts?
- If not, who implements changes to the system? Are they implemented by an individual or a small group, or can anyone implement changes?

Depending on the answers to the above questions, a DAO may be algorithmic (entirely dependent on software to implement changes), participatory (use community votes to make changes) or some combination of the two.

Appendix 3: DAO governance strategies

The following table summarizes common approaches DAOs employ to mitigate governance challenges.

Challenges	Approach	Examples
Low-quality proposals	Conviction voting Holographic consensus Continuous approval voting	1Hive DAOstack MakerDAO
Voter fatigue	Optimistic governance	TribeDAO
Voter apathy	Delegation	Index Coop's Metagovernance Council Wildfire DAO
Misaligned incentives	VeNomics	Curve
Low-context decision-making	Representation via councils	Index Coop's Metagovernance Council (MGC) Synthetix Spartan Council Element Governance Steering Council
Plutocracy	NFT-based voting systems Quadratic voting	Optimism Element Finance Marinade Finance Gitcoin (quadratic voting)
Rate of innovation	Governance minimization	Uniswap – allows for fixed-parameter changes only Reflexer – has outlined a path to immutability Liquidity – designed to be fully immutable

Appendix 4: Common open-source DAO frameworks

The following table summarizes common DAO frameworks, including their core features and year of launch.

Framework	Year launched	Examples	Core features
Aragon	2014	Lido Curve Decentraland	Customization Documentation Enterprise support
DAOstack/Alchemy	2014	DXdao PrimeDAO	Holographic consensus
Colony	2014	Metacolony	Lazy consensus Non-transferable voting Decaying reputation
Gnosis Safe	2019	Balancer ConstitutionDAO	Multisig App ecosystem
Moloch	2019	MolochDAO The LAO MetaCartel Ventures	Minimal Ragequit Non-voting shares
Compound Governor	2020	Compound Uniswap Gitcoin	Quorum Timelock Delegation Upgradeability
OpenZeppelin Governor	2021	ENS DAO	Quorum Timelock Delegation Upgradeability
1Hive Gardens	2021	1Hive BrightDAO	Participatory budgeting Dispute resolution
Tribute/OpenLaw	2021	The LAO Flamingo DAO	Modularity Multiple tokens Guild Kick Non-voting shares

Framework	Year launched	Examples	Core features
Sputnik (NEAR)	2021	Createbase	Multisig
Squads (Solana)	2022	Grape DAO	Multisig
Syndicate	2022	The Symmetrical Outliers Fund	Legal compliance for investment clubs
DAO (Cosmos)	2022	RAW DAO Juno	Multisig

Contributors

Lead Authors

David Gogel

Vice-President, Strategy and Operations, dYdX Foundation, Switzerland

Bianca Kremer

Research Fellow, Blockchain and Digital Asset Project, Wharton School, University of Pennsylvania, USA

Aiden Slavin

Project Lead, Crypto Impact and Sustainability Accelerator, World Economic Forum, USA

Kevin Werbach

Professor of Legal Studies and Business Ethics and Director, Blockchain and Digital Asset Project, Wharton School, University of Pennsylvania, USA

Acknowledgements

We would like to thank the following Working Group members for their contributions.

Nisa Amoils

Managing Partner, a100x, USA

Salman Banaei

Head of Policy, Uniswap Labs, USA

Shawn Bayern

Larry and Joyce Beltz Professor of Torts and Associate Dean for Academic Affairs, Florida State University, USA

Marc Boiron

Chief Legal Officer, dYdX Trading, USA

Tonya Evans

Professor, Penn State Dickinson Law and PSICDS Co-Hire, USA

Lucia Gallardo

Founder and Chief Executive Officer, Emerge, USA

Jason Gottlieb

Partner, Morrison Cohen, USA

Justine Humenansky

Lead, Metagovernance and Delegate Relations, Optimism Foundation, Cayman Islands

Miles Jennings

General Counsel, Crypto, a16z, USA

Alyssa Karchmer

Financial Services Consulting Staff, EY, USA

David Kerr

Principal Consultant, Cowrie, USA

Dane Lund

Core Contributor, Alliance DAO, USA

Massimo Morini

Chief Economist, Algorand Foundation, Singapore

John Morrow

Chief Operating Officer, Gauntlet, USA

Monique Morrow

Senior Distinguished Architect, Syniverse, Switzerland

Kelsie Nabben

Researcher, RMIT University Blockchain Innovation Hub/BlockScience, Australia

Scott Onder

Chief Investment Officer, Mercy Corps Ventures, USA

Joni Pirovich

Principal, Blockchain & Digital Assets – Services and Law, Australia

Dennis Post

Global Blockchain Tax Leader, EY, Netherlands

James Rathmell

General Counsel, Haun Ventures, USA

Daniel Resas

Co-Founder, Bubbles, Germany

Nathan Schneider

Assistant Professor of Media Studies, University of Colorado Boulder, USA

Kinjal Shah
Partner, Blockchain Capital, USA

Joshua Tan
Executive Director, The Metagovernance Project, USA

Tomicah Tillemann
Global Chief Policy Officer, Haun Ventures, USA

We would also like to thank the following reviewers and roundtable participants for their contributions.

Ruben Amenyogbo
Partner, Protocol Labs, USA

Viraj Ananth
Legal and Policy Lead, Poko, Singapore

Hayley Anna
Coordinator, Crypto Impact and Sustainability
Accelerator, World Economic Forum, USA

Raihan Anwar
Co-Founder, Friends with Benefits, USA

Justin Banon
Co-Founder, Boson Protocol, United Kingdom

Filipe Beato
Lead, Centre for Cybersecurity, World Economic
Forum, Switzerland

Deepa Chaudhary
Builder, Impact DAO Media, Canada

Shawn Dej
Lead, Blockchain and Digital Assets, World Economic
Forum, USA

Chris Duncan
Attorney, Carey Olsen, Cayman Islands and British
Virgin Islands

Savita Farooqi
Chair, IEEE P2145 Blockchain Governance Standards
Working Group, USA

Larry Florio
General Counsel, Delphia, USA

Spencer Graham
Product Manager, DAOhaus, USA

Gurvais Grigg
Global Chief Technology Officer Public Sector,
Chainalysis, USA

Jorge Herrada
Director, Office of Technology Innovation, US
Commodity Futures Trading Commission (CFTC), USA

Jorge Izquierdo
Co-Founder, Aragon, Switzerland

Natasha Vasan
Legal Intern, Uniswap Labs, USA

Anna Vvedenskaya
Lecturer, University of Amsterdam, Netherlands

Connie Kuang
Lead, Future of Media, Entertainment and Sport, World
Economic Forum, Switzerland

Chris Land
General Counsel, US Senator Cynthia M. Lummis,
USA

Dmitry Lapidus
Partner, Dragonfly, Singapore

Ian Lee
Co-Founder, Syndicate, USA

Robert Leshner
Founder, Compound Labs, USA

Cathy Li
Head of Media, Entertainment and Sport, Member of
the Executive Committee, World Economic Forum,
Switzerland

Stephanie Llamas
Project Lead, Metaverse, World Economic Forum, USA

Brynly Llyr
Head of Blockchain and Digital Assets, Crypto Impact
and Sustainability Accelerator, World Economic Forum,
USA

Brett McDowell
Chairman, Hedera Hashgraph, USA

Jessica Salama
Growth Lead, GoodDollar, Israel

Merixell Fernández Sancho
Growth, GoodDollar, Spain

Geoffrey See
Chief Executive Officer, Poko, Singapore

Connor Spellicsy
Executive Director, DAO Research Collective, Canada

Anna Stone
Director of Corporate Social Responsibility, eToro, USA

Joel Telpner
Chief Legal Officer, Input Output, USA

James Tunningley

Ecosystem Growth and Venture, Protocol Labs, United Kingdom

Esther Val

Head of Global Partnerships, ClimateCoin, Spain

Sandra Waliczek

Blockchain and Digital Assets, World Economic Forum, USA

Sheila Warren

Chief Executive Officer, Crypto Council for Innovation, USA

Linda Xie

Co-Founder, Scalar Capital, USA

Landon Zinda

Counsel, United States Senate, USA

We would also like to thank the members of the CISA Steering Committee and team:

Hayley Anna

Coordinator, CISA, World Economic Forum, USA

Gabriel Bizama

International Policy Lead, Stellar Development Foundation, Switzerland

Paul Brody

Global Blockchain Leader, Ernst & Young, USA

Michael Casey

Chief Content Officer, CoinDesk, USA

Evin Cheikosman

Policy Analyst, CISA, World Economic Forum, USA

Andrew Forman

Manager, Digital & Emerging Technology, Ernst & Young, USA

Gurvais Grigg

Global Public Sector Chief Technology Officer, Chainalysis, USA

Matthew Keller

Director, Algorand Foundation, USA

Candace Kelly

General Counsel, Stellar Development Foundation, USA

Brynly Llyr

Head of Blockchain and Digital Assets, CISA, World Economic Forum, USA

Massimo Morini

Chief Economist, Algorand Foundation, Italy

Cathy Mulligan

Project Fellow, CISA, World Economic Forum, USA

Nikhil Raghuvvera

Head of Strategy and Innovation, Celo Foundation, USA

Tomicah Tillemann

Chief Policy Officer, Haun Ventures, USA

Sheila Warren

Chief Executive Officer, Crypto Council for Innovation, USA

Ken Weber

Head of Impact, Ripple, USA

Samantha Weinberg

Project Specialist, CISA, World Economic Forum, USA

Amy Westervelt

Senior Delivery Lead, Energy Web Foundation, USA

Many thanks also to the policy-makers, regulators and industry leaders, both listed and unlisted, who shared their valuable time and insights in roundtables, in individual conversations and through written feedback.

Endnotes

1. Quarmby, Brian, "DAO Treasuries Surged 40x in 2021: DeepDAO", *Cointelegraph*, 31 December 2021: <https://cointelegraph.com/news/dao-treasuries-surged-40x-in-2021-deepdao>.
2. Ibid.
3. This document should not be considered as legal or tax advice. Section 4 identifies options for DAO legal wrappers and possible implications. However, it does not include any specific recommendations. Consult with a lawyer or tax adviser in your jurisdiction.
4. Smart contracts are computer codes that articulate, verify and automate a multiparty agreement.
5. A companion report provides more detail on the history of DAOs: *Decentralized Autonomous Organizations: Beyond the Hype*, World Economic Forum, 23 June 2022: <https://www.weforum.org/whitepapers/decentralized-autonomous-organizations-beyond-the-hype/>.
6. A hard fork is used to signify an update to a blockchain protocol that results in two separate blockchains. Ethereum was split into Ethereum and Ethereum Classic. For more, see: Konashevych, Oleksii, "Takeaways: 5 Years After The DAO Crisis and Ethereum Hard Fork", *Cointelegraph*, 17 July 2021: <https://cointelegraph.com/news/takeaways-5-years-after-the-dao-crisis-and-ethereum-hard-fork>.
7. Roose, Kevin, "What Is Web3", *New York Times*, 18 March 2022: <https://www.nytimes.com/interactive/2022/03/18/technology/web3-definition-internet.html>.
8. Jennings, Miles, "Principles & Models of Web3 Decentralization", a16z, 2022: https://a16z.com/wp-content/uploads/2022/04/principles-and-models-of-decentralization_miles-jennings_a16zcrypto.pdf.
9. Schuster, Andy, "7 Best Practices for DAO Season Planning", DAOMasters, 11 April 2022: <https://daomasters.mirror.xyz/kKTm1D3sjFSk9md1NSxXvC-2rIZ6emVTEJW8wZr2Uhs>.
10. For an expansive list, see: Messari, "Governor", 2022: <https://messari.io/governor/tools>.
11. Qian, Kassen, "DAO Essentials: 6 Key Onboarding Practices", DAO Masters, 22 December 2021: <https://daomasters.mirror.xyz/YNr-PuwUgp9LoK6xlrHhLlfKko2GHZr8g00wBnfhQbc>.
12. See, for example, Friends with Benefits' approach to seasonality: Turley, Cooper, "FWB Season Two – Slow New Friends", Friends with Benefits, 25 May 2021: <https://medium.com/friends-with-benefits/fwb-season-two-slow-new-friends-86222d680ca7>.
13. Calderon, Humpty, "How Decentralized Identity Can Take Crypto to the Next Level", The Defiant, 27 September 2021: <https://thedefiant.io/how-decentralized-identity-can-take-crypto-to-the-next-level>.
14. Peaster, William, "How to Join a DAO", Bankless, 14 September 2021: <https://newsletter.banklesshq.com/p/how-to-join-a-dao>.
15. Yearn, "The Blue Pill": <https://yifistory.org/thebluepill>.
16. Different frameworks provide different levels of customizability. Aragon, perhaps the first DAO framework, focused on a series of "off-the-shelf" templates, while Tribute and other new contenders emphasize more modular, extensible designs – although the forthcoming Aragon v3 release will also feature a more modular design philosophy. Combining multiple frameworks can offer DAOs optionality.
17. For example, Gnosis Safes are specialized for governing simple multisignature wallets (multisigs), while Syndicate is tailored for investment clubs. Moloch DAOs are known for their "ragequit" feature – allowing participants to leave at any time with a pro rata proportion of the treasury – while Compound's secure-governance contracts are used by many large DeFi and protocol DAOs.
18. Many frameworks are already closely related to each other; for example, Moloch v2 DAOs, via their Minions framework, can effectively own and govern a Gnosis Safe. 1Hive Gardens is a community-directed direct fork of Aragon's original contracts, while OpenZeppelin Governor is a fork of Compound Governor that highlights OpenZeppelin's work auditing and securing contracts.
19. dYdX, "dYdX exchange": <https://dydx.exchange/>.
20. dYdX, "Proposal Lifecycle": <https://docs.dydx.community/dydx-governance/voting-and-governance/dip-proposal-lifecycle>.
21. See, for example, VeNomics: NTinc, "Governance Burrow Venomics Research Part 1", dYdX, 11 July 2022: <https://forums.dydx.community/discussion/6093-governance-burrow-venomics-research-part-1>.
22. MakerDAO, "A Guide to Participating in MakerDAO Governance": <https://makerdao.world/en/learn/governance/how-voting-works/>.
23. Buterin, Vitalik, "Moving Beyond Coin Voting Governance", 16 August 2021: <https://vitalik.ca/general/2021/08/16/voting3.html>.
24. Optimism Collective: <https://gov.optimism.io/>.

25. The right legal structure for any DAO will depend on several factors. See Kerr, David and Jennings, Miles, “A Legal Framework for Decentralized Autonomous Organizations”, June 2022: <https://a16zcrypto.com/wp-content/uploads/2022/06/dao-legal-framework-part-1.pdf> and Brummer, Chris and Seira, Rodrigo, “DAO Strategy and Legal Wrappers”, 8 June 2022: <https://www.paradigm.xyz/2022/06/dao-strategy-and-legal-wrappers> for two attempts to provide guidance about the major options. While the main approaches that DAOs are currently taking are identified here, note that uncertainties remain about regulatory and tax treatment in many jurisdictions.
26. Legal Information Institute, “31 US Code § 5336 – Beneficial Ownership Information Reporting Requirements”: <https://www.law.cornell.edu/uscode/text/31/5336>.
27. Commodities Futures Trading Commission, “Release Number 8590-22”: <https://www.cftc.gov/PressRoom/PressReleases/8590-22>.
28. Ibid.
29. Werbach, Kevin and Cornell, Nicolas, “Contracts Ex Machina”, *Duke Law Journal* 67, 313–382, 2017: <https://scholarship.law.duke.edu/dlj/vol67/iss2/2/>.
30. OpenLaw has created open-source tools for wrapping DAOs as LLCs. See OpenLaw, “The Era of Legally Compliant DAOs”, 26 June 2019: <https://medium.com/@OpenLawOfficial/the-era-of-legally-compliant-daos-491edf88fed0>.
31. Kerr, David and Jennings, Miles, “A Legal Framework for Decentralized Autonomous Organizations”, June 2022: <https://a16zcrypto.com/wp-content/uploads/2022/06/dao-legal-framework-part-1.pdf>.
32. MME, “Decentralized Autonomous Association (DAA)”, 4 May 2020: <https://www.mme.ch/en/magazine/articles/decentralized-autonomous-association-daa>.
33. The most prominent DAO organized under this structure is dYdX, a DeFi derivatives platform: dYdX Foundation, “Legal Framework for Non-US Trust in Decentralized Autonomous Organization”, 15 March 2022: <https://dydx.foundation/blog/legal-framework-non-us-trusts-in-daos>.
34. DAO Research Collective, “Legal Entity”: <https://daocollective.xyz/legal-entity/>.
35. State of Wyoming 66th Legislature, “SF0038 – Decentralized Autonomous Organizations”, 2021: <https://www.wyoleg.gov/Legislation/2021/SF0038>; Tennessee House Commerce 1, “Amendment No. 1 to HB2645”: <https://www.capitol.tn.gov/Bills/112/Amend/HA0748.pdf>; and Vermont General Assembly, “Title 11: Corporations, Partnerships and Associations. Chapter 025: Limited Liability Companies”: <https://legislature.vermont.gov/statutes/section/11/025/04173>.
36. Colorado Legislature, “Chapter 197 Corporations and Associations”: http://www.leg.colorado.gov/sites/default/files/images/olls/2011a_sl_197.pdf.
37. Coalition of Automated Legal Applications, “Model Law for Decentralized Autonomous Organizations”: <https://coala.global/wp-content/uploads/2021/06/DAO-Model-Law.pdf>.
38. The right legal structure for any DAO will depend on several factors. See Kerr, David and Jennings, Miles, “A Legal Framework for Decentralized Autonomous Organizations”, June 2022: <https://a16zcrypto.com/wp-content/uploads/2022/06/dao-legal-framework-part-1.pdf> and Brummer, Chris and Seira, Rodrigo, “DAO Strategy and Legal Wrappers”, 8 June 2022: <https://www.paradigm.xyz/2022/06/dao-strategy-and-legal-wrappers> for two attempts to provide guidance about the major options. While we identify here the main approaches that DAOs are currently taking, we note that uncertainties remain about regulatory and tax treatment in many jurisdictions.
39. A senior SEC official in 2018 indicated that entities issuing tokens might not be subject to securities regulation if they were “sufficiently decentralized”. This was not a formal ruling of the agency, however, and has not been clarified beyond its applicability to Ethereum. See Hinman, William, “Digital Assets Transactions: When Howey Met Gary (Plastic)”, 14 June 2018: <https://www.sec.gov/news/speech/speech-hinman-061418>.
40. Dale, Brady, “DAOs Prepare for the Next Crypto Winter With Treasury Diversification”, CoinDesk, 3 June 2021: <https://www.coindesk.com/business/2021/06/03/daos-prepare-for-the-next-crypto-winter-with-treasury-diversification/>.
41. Bitcoin, for example, requires that proposals receive input from at least five community stewards not connected to the proposal or working with the sponsoring workstream.
42. RabbitHole Metagovernance Pod has advocated that snapshot votes should not be tied to forum posts that can be edited (perhaps after a vote has passed, effectively changing important terms). MakerDAO puts all proposals up to a vote on Fridays to help manage the otherwise 24/7 nature of protocol governance.
43. Zargham, Michael and Nabben, Kelsie, “Aligning ‘Decentralized Autonomous Organization’ to Precedents in Cybernetics”, 6 May 2022: <https://ssrn.com/abstract=4077358>.
44. Stevens, Robert, “What Is Tokenomics and Why Is It Important?”, CoinDesk, 11 November 2022: <https://www.coindesk.com/learn/what-is-tokenomics-and-why-is-it-important/>.
45. See Kerr, David and Jennings, Miles, “A Legal Framework for Decentralized Autonomous Organizations”, June 2022: <https://a16zcrypto.com/wp-content/uploads/2022/06/dao-legal-framework-part-1.pdf> and Brummer, Chris and Seira, Rodrigo, “DAO Strategy and Legal Wrappers”, 8 June 2022: <https://www.paradigm.xyz/2022/06/dao-strategy-and-legal-wrappers> for two attempts to provide guidance about the major options.



COMMITTED TO
IMPROVING THE STATE
OF THE WORLD

The World Economic Forum, committed to improving the state of the world, is the International Organization for Public-Private Cooperation.

The Forum engages the foremost political, business and other leaders of society to shape global, regional and industry agendas.

World Economic Forum
91–93 route de la Capite
CH-1223 Cologny/Geneva
Switzerland

Tel.: +41 (0) 22 869 1212
Fax: +41 (0) 22 786 2744
contact@weforum.org
www.weforum.org