Decentralized autonomous organizations (DAOs): stewardship talks but agency walks

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Abstract

Although the governance of Decentralized Autonomous Organizations (DAOs) has attracted the interest of several academics, few studies have empirically examined how DAOs are governed. We use an exploratory, inductive approach to comprehensively examine how DAOs are currently governed and the ramifications of this. We conducted in-depth interviews with 20 DAO members from a variety of sectors to identify how they arrange their voting processes, distribute collaborative decision-making, and maintain their tokens. Three themes emerge from the thematic analysis of the data: (1) voting structure, (2) proposal management, and (3) token management. Participants describe the notion of DAOs as closely aligned with stewardship philosophy, encompassing collaborative and altruistic activity toward a common purpose. However, the operations and methods implemented are more oriented toward agency viewpoints due to their reliance on incentive-based processing and are based on a lack of trust among DAO stakeholders. This study provides empirical insights into DAO governance mechanisms.[1]

Keywords: DAO; Agency theory; Organization governance; Organization design

Declarations of interest: none

[1] Decentralized autonomous organizations (DAOs)

1. Introduction

The advent of blockchain technology has prompted practitioners and academics to investigate its applications (e.g. Goldberg & Schär, 2023; Kim et al., 2023; Hanisch et al., 2023). One of blockchain's applications has spawned an organizational revolution that has the potential to alter the structure of the standard organization permanently. DAOs represent one of the most innovative applications of blockchain. DAOs epitomize the decentralization ethos brought forth by blockchain technology, as they operate autonomously and collectively without centralized control, a concept deeply resonant with the ideas presented by Lumineau, Wang and Schilke (2020) regarding the shift away from traditional intermediary-reliant organizational structures towards more transparent, immutable, and distributed consensus mechanisms. Simply put, a DAO is an organization that operates autonomously through rules encoded as computer programs called smart contracts (Buterin, 2014).

A DAO is essentially an organization run by code, without centralized control, where decisions are made collectively by its members or stakeholders (Buterin, 2014). DAOs are built and managed on blockchains such as Ethereum (Angieri et al., 2019). They are able to create their own tokens and rules using smart contracts written in the code. DAOs strive to have autonomous governance based on a mix of on-chain and off-chain processes that facilitate decentralized community decision-making, eschew top executive teams, and are founded on automated rules encoded in smart contracts (Santana & Albareda, 2022).

While these applications are in the early stages of development and have yet to prove their capabilities in terms of adoption or widespread use, their early successes demonstrate a need for further research and analysis. DAOs are being created by major companies, including L'Oreal's NYX (Wray, 2022), and tested by governments in countries like Japan (Crawley, 2022), paving

the way for their use in both the private and public sectors. Thus, DAOs may one day pose a threat to the dominant business models of multinational conglomerates. This emerging paradigm has drawn the attention of regulatory bodies. Further, we have observed widespread regulatory approval of DAOs, such as in the United States, where a DAO with up to 99 members may be lawfully registered as a Delaware corporation (Farmer & Cahill, 2022).

In recent years, DAO governance has witnessed a significant surge. According to Ernst & Young Global (2023) as of May 2023, there are over 13,000 DAOs operating globally, a testament to the growing acceptance and trust in decentralized governance structures. These DAOs span various sectors, from finance to arts and have collectively managed assets worth over $37 billion (DeepDAO, 2024), showcasing the potential and robustness of their governance models. Notably, platforms like Aragon, DAOstack and DAOhaus have become pivotal in facilitating the creation and management of these decentralized entities, reflecting the burgeoning ecosystem supporting DAOs (De La Iglesia, 2022).

Existing research on DAOs mainly revolves around conceptual review-based approaches (e.g. Santana & Albareda, 2022; Murray et al., 2021), including legal (e.g. Tse, 2020) or technical approaches (e.g. Axelsen et al., 2022). There is a paucity of research exploring the governance of DAOs from the perspectives of the DAO stakeholders themselves on what appears to work and what causes concern in present DAO governance. Growing academic voices (Santana & Albareda, 2022; Zachariadis et al., 2019; Hsieh, Vergne & Wang, 2018) have called for the elimination of gaps in knowledge concerning DAOs and their governance frameworks. This exploration into DAO governance aims to bridge the identified gap in literature, offering a deeper insight into the functionality of emergent governance models within these novel organizations.

2. Literature Review

Our study builds upon relatively recent research focused on the governance approaches involving DAOs. A DAO is defined as

> "*An organization whose essential operations are automated, agreeing to rules and principles assigned in code without human involvement. A DAO is a novel, scalable, self-organizing coordination on the blockchain, controlled by smart contracts.*" (Singh & Kim, 2019: 119)

With a market capitalization of close to $38 billion (DeepDAO, 2024), it is no surprise that they have piqued the interest of many scholars. The focus in the field of DAO research is mainly restricted to conceptualizations and reviews (e.g. Zachariadis et al., 2019; Murray et al., 2019) rather than empirical works, owing to the novelty of the issue and the difficulties of gaining access to participants. However, various scholars (Santana & Albareda, 2022; Zachariadis et al., 2019; Hsieh, Vergne, Anderson, Lakhani & Reitzig, 2018) led calls to alleviate research gaps within the emerging field of DAO governance surrounding DAOs and their governance structures.

The governance of DAOs is particularly intriguing to corporate governance scholars because, in the DAO concept, neither a governing body nor a management structure exists. Instead, the management and operational norms of the DAO are encoded on immutable blockchains and rely on the cooperation and collaborative decision-making of all members (Wang et al., 2019). In a DAO, token holders have a voice in determining managerial decisions through voting and developing proposals to be voted on (Hsieh, Vergne, Anderson et al., 2018). This emergent model of governance could signal a shift in the way organizations coordinate transactions and interactions, potentially reducing dependency on traditional intermediary structures and centralized authority (Lumineau, Wang & Schilke, 2020). When it comes to the governance of a

conventional business, researchers and managers face principal-agent difficulties and competing interests. DAOs have the potential to alleviate these concerns (Murray et al., 2019).

The fundamental internal instruments of the DAO structure include token issuance, autonomous execution, formalized consensus, contractual prospects, proposal capabilities, voting mechanisms, and data information flows (Voshmgir, 2019). Hennekes (2022) distinguishes between a variety of DAO sectors, including service DAOs, protocol DAOs, investment DAOs, and media DAOs. Consequently, it is evident that DAOs may be developed in numerous industries and be comparable to conventional firms. Access to the DAO may be gained by purchasing fungible or non-fungible tokens, submitting a proposal (application), or cultivating a favorable reputation (Ethereum, 2022).

Even though few scholars address voting structures, El Faqir et al. (2020) present a review of DAO infrastructure service platforms. Platforms such as Aragon and Colony are discussed concerning the voting mechanisms, they provide for DAOs. These methods may vary from work-driven voting allocations to paying to vote. Researchers also examine the roles and responsibilities of founders, investors, developers, and more (Santana & Albareda, 2022). With a focus on laying the groundwork for future success, the company's founders are tasked with creating a white paper containing a roadmap of the organization's technical and operational details (DuPont, 2019). Owners of tokens or investments are tasked with making contributions, casting votes, and coming up with proposals (Santana & Albareda, 2022). Developers are accountable for the DAO white paper and guidelines for future amendments by writing, implementing, and creating a smart contract embedded in blockchain technology (Buterin, 2014). Alternatively, Zachariadis et al. (2019) concentrated on the issues faced by dispersed governance, including the alignment of

transparency and independence, decision-making authority, governing methods, and incentive systems.

The existing body of research on DAO governance has mostly dissected it through the prism of either agency theory (e.g. Murray et al., 2019), transactional cost theory (e.g. Zachariadis et al., 2019; Lumineau, Wang & Schilke, 2020), theory of institutions for collective action (e.g. Rozas et al., 2021), or socio-materiality theory (e.g. Santana & Albareda, 2022). While various theories offer insights into the mechanics and dynamics of DAO governance, the study predominantly anchors itself in agency and stewardship theory as these frameworks critically delineate the relationships between DAO stakeholders, including principals and agents.

Agency theory is a concept that outlines the connection between two parties in which one (principal) employs another (agent) to complete a function with the expectation that it will create value (Bosse & Phillips, 2016). According to agency theory, the objectives of shareholders and management agents often differ. Managers might utilize the underlying knowledge asymmetry that results from their role inside a corporation for self-serving reasons instead of goals that better fit owners' interests (Bruhl, 2003). Token holders (principals) and the DAO (agent) may be analyzed through the lens of agency theory. The token holders invest in the DAO to obtain value in return, while the DAO functions as an autonomous agent that manages the organization's activities (Murray et al., 2019). There is no top-down leadership in the DAO concept. Instead, management decisions are democratized between all members (token holders). In this way, DAOs lower agency expenses by removing the need for principals to oversee and instruct agents (Murray et al., 2021). Further, since everything is coded on the blockchain, DAOs ensure the security and visibility of all information relevant to the principal–agent dynamic (Yermack, 2017).

However, it's pertinent to acknowledge that, within the context of a DAO, the dichotomy between principal and agent can be more complex and multifaceted. While the paper delineates token holders as principals and the DAO as the primary agent, there are other significant players in the ecosystem that can also be classified as agents. Developers and miners of the blockchain, on which the DAO operates, serve as agents, to a degree. Miners play a pivotal role in executing, verifying, and validating token holders' transactions, actions, and votes. Meanwhile, developers shoulder the responsibility for the technical progression and stability of the blockchain. Their decisions, particularly those pertaining to transaction costs or advancements in smart contract technology, can drastically influence the trajectory of the DAO's governance. Another layer of complexity emerges when considering the founders or developers of the DAO. They often straddle the roles of both principal and agent. As founders, they are heavily invested in the success and growth of the DAO, aligning with the role of principals. Yet, as developers or maintainers, they also execute essential functions and tasks, echoing the role of agents. This dual role presents unique challenges and opportunities in the DAO governance structure.

Contrasting this agency perspective is the stewardship theory, which posits that managers or decision-makers act in the best interests of stakeholders, aligning their actions and intentions for the greater benefit of the organization (Hernandez, 2012). Stewardship theory suggests a harmonious alignment between managers (or agents) and stakeholders (or principals), with the former being intrinsically motivated to ensure the success and wellbeing of the latter (Grundei, 2008). In the context of DAOs, this translates to the belief that members, being both token holders and decision-makers, operate in tandem for the collective good, devoid of conflicts and power struggles.

One option to connect the interests of token holders and the DAO is through incentive alignment structures, such as outcomes-based incentives or rewards (Benligiray, 2021). DAOs issue tokens to their members, which symbolize ownership and entitle them to participate in decision-making and a portion of the organization's profit. As a result, DAO members would be incentivized to operate in the best interests of the DAO since their benefits would be contingent on the DAO's success. DAOs may also form a board of directors or an elected council that functions as a mediator between token holders and the DAO, ensuring that the organization operates in their best interests. However, token holders and the DAO may also experience the misalignment of interests that plagues conventional organizations (i.e., the principal–agent problem; see Bosse & Phillips, 2016). Token holders may have various goals and may not always operate in the organization's best financial interest.

Transaction cost theory has also been applied to DAOs because of its potential to lower transaction costs in the market (Berg et al., 2019). DAOs eliminate ambiguity and opportunistic behavior among investors by offering a comprehensive contractual paradigm. They lower transaction costs of economic coordination by enabling an alternative type of integrated economic governance for peer-to-peer transactions (Davidson et al., 2018). On the other hand, institutions in favor of collective action theory describe how local users of common pool resources adopt design principles to self-regulate and prevent self-serving conduct (Ostrom, 1990). DAOs use collaborative action to develop, debate, and vote on software protocol rules and resource verification (Santana & Albareda, 2022). DAOs have been examined as collective action institutions with collective self-governance, a shared combination of resources, frameworks, automated activities, and programmed procedures to eliminate self-serving behavior (Rozas et al., 2021). With reference to socio-materiality theory, researchers posit that DAOs’ social and material

forces become intertwined and develop new kinds of organizational design that allow peer-to-peer networks to operate autonomously (Santana & Albareda, 2022).

In juxtaposing agency theory against other prevalent theories, we can deduce that transactional cost theory offers a lens focused more on the operational efficiencies DAOs bring in terms of reduced transactional costs (Berg et al., 2019). Meanwhile, the theory of institutions for collective action leans toward understanding how DAO members collaboratively regulate and oversee shared resources, emphasizing collective decision-making (Ostrom, 1990). Socio-materiality theory, on the other hand, delves into the intertwined relationship between the social and material aspects of DAOs, showcasing how they co-evolve and influence organizational design and dynamics (Santana & Albareda, 2022). While each of these theories presents unique angles, the core debate often circles back to the dynamics between principals and agents, which agency and stewardship theories fundamentally address.

3. Methodology

The qualitative research methodology utilized in this study yields illustrative insights (Alvesson & Kärreman, 2011) into the perspectives on DAO governance of DAO creators, consultants, investors, and members on DAO management. Insights were gleaned through an in-depth examination of 20 semi-structured interviews comprising eight founders, six managers/agents, three consultants, and three investors from 20 distinct DAOs. Each interview lasted between one and one and a half hours (see details in Table 1). Interviews with a semi-structured format were considered suitable for eliciting extensive narratives on organized topics related to the article's central research premise (Bryman, 2016).

INSERT TABLE 1

In order to understand the complex environment in which DAOs operate, samples were purposefully selected to represent a wide range of DAO sectors. The sample includes participants from collectors, media, protocol, service, philanthropy, investment, social, community, impact, and operating system DAOs. In order to shed light on the research questions, participants were carefully selected using the criteria for purposeful sampling set out by Lincoln and Guba (1985). We meticulously selected participants from a wide variety of DAO sectors involved in the governance of the DAOs, whether they were consultants assisting in the structure of the DAO, founders delegating the smart contracts in governance, investors participating in the voting and proposal process, or managers overseeing them. In order to compile our sample, we relied on a wide range of resources, including in-person interactions, cold emails, and social media, such as LinkedIn and Discord. Notably, the purpose of an inductive study is not to generalize society in its entirety, but rather to inductively build theoretical enlightenment into the approaches that underlie the research topic (Eisenhardt & Graebner, 2007). Further, Guest et al. (2006) observed that theoretical saturation became evident while conducting interviews with six to twelve participants; hence, the sample size of 20 is considered suitable to attain both data and theory saturation.

Participant selection procedure:

1. *Initial pool creation:* To kickstart the selection, an exhaustive list of potential candidates was formed. This list, encompassing various DAO sectors, was constructed using multiple avenues: DAO directories, conference attendee lists, DAO-associated publications, expert referrals, and existing professional contacts.

2. *Preliminary screening:* From this expansive list, a preliminary screening was executed based on predefined criteria, such as their direct involvement in DAO governance, the scope of their role (e.g., founder, consultant, investor), and any notable contributions to DAO discourse.
3. *Diversity assurance:* A secondary review of the shortlist ensured varied perspectives, considering factors such as DAO sector, size, geographical location, and governance model. This step was crucial to guarantee a diverse, comprehensive representation across all participant roles.
4. *Engagement and willingness:* Potential participants were approached through personalized communications, expressing the study's objectives and its academic purpose. Their willingness to contribute, availability for in-depth interviews, and readiness to be potentially quoted were vital selection determinants.
5. *Judgment sampling:* Aligning with Lincoln and Guba's (1985) criteria for purposeful sampling, we then employed "judgment sampling". This involved a committee of three research members reviewing each candidate's profile, ensuring that they not only fit the study's criteria, but were also poised to offer profound insights into DAO governance due to their unique experiences and positions.
6. *Final compilation:* The final list of 20 was a balanced ensemble, ensuring representation from collectors, media, protocol, service, philanthropy, investment, social, community, impact, and operating system DAOs. These participants, ranging from consultants assisting in DAO structuring to managers monitoring operations, were pivotal in offering comprehensive insights. We engaged with these participants through various means, such

as in-person dialogues, virtual meetings, cold emails, and social media platforms like LinkedIn and Discord.

Our semi-structured interviews explored five primary topics: (1) participants' academic backgrounds and professional experience; (2) participants' assessments of DAO governance structures; (3) review of token structures, strategy, and management; (4) the role of participants in a DAO; and (5) evaluation of treasury management in DAOs.

The interviews were recorded, transcribed, anonymized, and then coded around the themes that emerged from the participants' experiences and insights (Saldaña, 2009). Over 550 pages of transcripts were compiled.

The three-step technique of producing first-order codes, consolidating first-order codes into second-order codes, and delineating theory through pooling theoretical aspects into conclusive themes was the basis for our data analysis strategy (Strauss & Corbin, 1990). The overarching themes were identified by an in-depth, iterative, and reflective analysis of the interview data (Braun & Clarke, 2006). We used an inductive interpretative method for thematic development to grasp the themes and their comprehensive insights and consequences (Patton, 1990). We continued cycling through data, existing literature, and our own developing theories. The coding for new themes was conducted inductively. Through this iterative approach, we were able to construct a model based on the shared experiences of all our participants. The major themes, subthemes, first-order codes, and illustrative quotes are shown in Table 2.

INSERT TABLE 2

Following the conclusion of the interviews, all interview transcripts were imported into the NVivo software. We began by coding the data using an open-coding strategy. First-order codes

were developed, and then the transcripts of the interviews were reviewed again to code for additional direct phrases. Several expressions of the process of structuring a DAO's governance arose. It became apparent that participants were organizing their DAO's governance around a number of issues that are essential to the DAO's ability to function in a manner consistent with its nature. First- and second-order theme analysis rested on these critical concerns.

The second phase of data analysis was determining how the first-order categories interacted with one another, so that they might be merged into more general second-order themes (Platt, 1981). Along these lines, we progressed from concepts that were directly supported by our data to more theoretically abstract ones. For instance, the first-order codes for "one member, one vote," "one token holder, one vote," and "delegated voting" have been collapsed into the second-order theme "simple structures". At this level, we also began to condense data by discarding preliminary classifications that lacked sufficient evidence to justify their ongoing incorporation. In addition, we iterated across our observations and the research to produce a more comprehensive theoretical explanation of the data.

The third phase included organizing second-order themes into penultimate themes that mirrored the data's underlying patterns of significance. We understood the narrative being communicated by data at this juncture by testing out multiple possible theoretical frameworks that appropriately reflect the topic. For instance, we discovered connections between participants' remarks depicting the process of proposal management, the roles played by those participating, the function served by proposals inside the organization and the principles of stewardship. We refined our emergent themes through numerous rounds to ensure they reflected the actual narrative.

We were conscious that our prior experience with corporate governance and DAOs could potentially impact our data analysis. Hence, we utilized several strategies to ensure this study's

reliability and minimize bias. First, we exercised bracketing by singling out our personal experiences and convictions concerning the governance of DAOs and placing them aside, so that the inquiry procedure was deeply embedded in the topic in question (Moustakas, 1994). Second, our semi-structured interview design permitted member checks. Interviewees were prompted to expound on their previous statements and address any misinterpretations made by the interviewer. Member checks are deemed essential to building credibility in qualitative inquiry (Maxwell, 2005). Third, we practiced triangulation through the independent evaluation of data and later collating our discoveries (Merriam, 2009). Lastly, we also used thick descriptions in order for readers to draw their own conclusions about how applicable the study's results are to their own circumstances. (Creswell & Miller, 2000).

In an endeavor to enrich our insights and provide a more comprehensive view of the data collected, we have incorporated descriptive statistics and coding frequency analysis. Such quantitative measures have been meticulously analyzed and are presented in the appendix of this paper. This approach not only underscores the prevalence of certain patterns and themes, but also enhances the robustness of our qualitative findings. It is our belief that juxtaposing qualitative insights with quantified data allows for a more nuanced understanding of the complexities inherent in DAO governance.

Over time, our analysis of the interviews yielded three distinct themes: the voting structure in DAOs, proposal management, and token management. The taxonomy in Table 2 serves as a comprehensive framework to understand the multifaceted nature of DAOs governance. By categorizing various practices and structures into coherent themes, it provides readers with a structured perspective on how DAOs operate and make decisions. Each theme, from voting

structures to token management, represents unique governance mechanisms, illustrating the diversity and richness of decision-making practices within DAOs.

To ensure the representativeness and robustness of the interviewees' opinions on voting structure, proposal management, and token management, our study employed several strategies. First, we meticulously selected a diverse sample encompassing various roles within the DAO ecosystem, capturing a comprehensive range of perspectives. Second, Triangulation of data sources was another approach we adopted, juxtaposing interview data with secondary sources such as DAO documentation, governance proposals, and voting outcomes. This added depth and validation to our findings. While acknowledging the inherent subjectivity in qualitative feedback, we viewed it as an avenue to gain profound insights into the nuanced aspects of DAO governance, rather than a limitation. Finally, aiming for analytic generalization, our study sought to extend the findings from our diverse sample to broader theoretical constructs of DAO governance. By doing so, we strived to present a well-rounded and representative perspective on the complex domains of voting, proposal, and token management in DAOs. The following findings and discussion sections offer greater theoretical development of the themes.

4. Findings and Discussion

Data analysis of the participant interviews revealed three overarching themes: voting structure, proposal management, and token management. For each theme, textual-structural descriptions that strongly depend on the participants' own statements are supplied to preserve the “situated” nature of the findings (Polkinghorne, 1989: 54).

Building upon these foundational findings, the necessity and significance of elucidating the themes arise from both their inherent complexity and their pivotal role within DAO

governance. The intricacies of voting structures, for instance, have far-reaching implications for the inclusivity and fairness of decision-making within a DAO. It is paramount to discern how different voting mechanisms either potentially enhance or hinder democratic participation. Similarly, the management of proposals serves as a testament to a DAO's transparency, efficacy, and adaptability, where the means of introducing, debating, and implementing changes can vastly influence the trajectory of the organization. Token management, as the operational backbone of many DAOs, underscores the equilibrium between stability and equity in the ecosystem. By intertwining these themes with existing literature, we shed light on their broader context and relevance. Moreover, these insights can furnish real-world DAOs with a robust compass for governance, guiding both new and existing entities in their quest for optimized decentralization.

4.1 Voting structure

This overarching theme embodies three subthemes, each explaining unique voting mechanisms that our study participants utilized and/or experienced in their DAOs. We name these structures based on their most prominent characteristics – simple, contemporary, and incentive-based structures. Each of these structures will be examined individually hereunder.

4.1.1 Simple structures

The participants reported a variety of simple structures. Many DAOs are investigating ways to build robust voting mechanisms for their members (Wright, 2020). We use the term simple structures for those reminiscent of democratic and traditional shareholder voting. Simple structures reduce the burden of constructing voting processes, yet they pose their own challenges. Early DAOs, including the defunct “The DAO” which was infamously exploited, explored the “one token, one vote” structure (Schmitten et al., 2022). One study participant (P5) describes this

structure: "*Every token holder gets to vote on anything in proportion to their tokens. There is no council or any board.*" However, this structure creates two glaring risks. First, an individual or entity might control the votes if they acquire a sufficient number of tokens. Second, if a hacker obtains the tokens, they might deplete the treasury (akin to what occurred with "The DAO").

Adopting a democratic voting system in which each member receives one vote regardless of the number of tokens they own through KYC measures would be one way to mitigate the first risk identified above. According to one DAO COO (P16), "*We call ourselves a democratic DAO because no matter how many tokens you hold, you always have an equal vote to everyone else*." However, this might adversely affect or disincentivize individuals with more "skin in the game" or who are more active since their vote would be practically equivalent to that of a less active member. As one DAO co-founder (P15) comments, "*It doesn't matter how many NFTs you have in your wallet, you have one vote. One person, one vote. It doesn't matter if you help the DAO grow or not. It is not rewarding.*"

DAOs may use delegated voting as a countermeasure to non-participation. Delegated voting is often directly integrated into the token protocol as a feature that allows token holders to delegate the vote linked with their status to a third-party address without losing possession of the tokens (Axelsen, 2022). A DAO co-founder (P20) considers that delegated voting is,

> "*rather useful to delegate tokens to governance power to someone to vote on your behalf on a wide range of proposals. But you can also, within a proposal basis, say, 'Okay, in this proposal, I don't know how I'm going to vote. So, I'm now going to delegate it to the next person.' On another proposal, you may actually know more about the matter, so you vote yourself.*"

In contrast, some DAOs do not permit members to vote on proposals, but they do enable members to choose a representative, as explained by one DAO's general manager (P1): "*Every single month they can claim a token and delegate it to a founder to increase that founder's voting power. So essentially, they're choosing a representative through the delegation process*." To elaborate, this DAO places founders on a higher tier and requires members to select a founder to represent them in voting, which arguably is against the essence of DAOs. However, DAOs are still in the early phases of development.

This approach highlights a hybrid model where both agency and stewardship theories intersect; while it allows for representative decision-making by agents (agency theory) (Eisenhardt, 1989), it also aims to preserve the democratic, participatory ethos of DAOs (stewardship theory) (Lachmund, 2022; Davis et al., 2018). However, placing founders on a higher tier and requiring members to select a founder to represent them in voting could be seen as moving away from the ideal of complete decentralization and collective stewardship.

4.1.2 Contemporary structures

Since DAOs are still in their infancy, their designers, developers, and founders continually experiment and strive to determine the optimal voting structure. The blockchain technology's capacity for decentralized consensus and automated processes as described by Lumineau, Wang, and Schilke (2020), are foundational features that have a potential impact on the emergent voting structures within DAOs. This experimentation has led to the emergence of several contemporary voting systems. One of the emerging structures is referred to as reputation-based voting. A DAO co-founder (P9) uses an analogy to depict this:

> "*We are figuring out how to use reputation-based voting. I think about it like in the US; we have one person, one vote. I'm not political at all. I don't follow politics, and I always*

thought it was crazy. So, when I vote, there's someone who's probably dedicated their whole life to political science, and I'm essentially cancelling their vote out simply because I feel like I should be voting when I am not qualified."

Some DAO governance models effectively incentivize members to engage by utilizing a "use it or lose it" strategy. For example, the decaying model, which is outlined by a DAO co-founder (P6):

"*There's an inherent decaying model where people who are using this governance and participating in the voting mechanism will then keep on their allocated governance token. But if you're not participating in the DAO, it will start decaying over time.*"

Others seek to lessen the administrative overhead of voting control by restricting the number of tokens that may be assigned to a single proposal. This model is known as conviction voting. One DAO consultant (P19) explains conviction voting as "*having to allocate your different tokens within different proposals during a vote, and so there is a cap. So, for example, you have a maximum of 20 tokens in each one [proposal]*."

There are voting mechanisms that are explicitly designed to reduce the influence of members owning a large number of tokens. One such method is quadratic voting, intended to alleviate the issue of voting influence. However, it diminishes the voting power of investors with more tokens and raises the cost of their hegemonic voting (Ding et al., 2021). A head of a DAO strategy (P14) explains the use of quadratic voting: "*Say there's someone who holds the majority of the votes. They should not make the decisions on their own. We implement quadratic voting so that everything is a little bit more balanced*." However, quadratic voting has downsides – it may succeed in reducing the impact of hegemonic voting, but fails to eliminate it completely.

4.1.3 Incentive-based structures

As Chohan (2017) concurs, the procedural aspect of voting on DAO-related amendments presents a challenge. Consequently, DAOs lack voter involvement or engagement due to the time and effort necessary to evaluate each proposal. The participants acknowledge this challenge and have devised incentive-based strategies known as "voting bribing" to address it. As a DAO co-founder (P6) puts it:

> "*You have something like voting bribing; it basically incentivizes the community to come and join and participate in the governance, whether it's from setting up proposals or just voting… If no one else is participating. It basically means that the core team is just voting by themselves. So, you want to incentivize the community to join and vote further.*"

According to Tse (2020), voter apathy will likely be a problem when designing the DAO programming and adding incentive- or reward-based systems. One DAO's COO (P16) recognizes this:

> "*Some (DAOs) use incentivization to vote, but I dislike it because it leads to voter apathy, which means they vote on whichever proposal they think will pass. I think it's better to have less participation but better quality voters.*"

Due to the low likelihood of a single vote influencing the outcome, the expenditure of doing comprehensive research to cast an educated vote outweighs the utility of voting (Downs, 1957). Thus, this may explain why incentivizing voters results in voter apathy and why shareholders in typical corporations abdicate this responsibility to the board of directors and management.

Transformational emergence (Kempton, 2022) may be seen in the context of DAOs by observing how the governance of a DAO evolves in response to alterations in its voting mechanisms. This is evident by the several voting mechanisms now in use and the ongoing process of trial and error. Members' actions and choices, including voting and engaging in governance,

may alter the DAO's smart contracts and general structure. Transformational emergence (Kempton, 2022) may be used to understand how the governing structures of these organizations can develop and adapt through time due to their interactions. For instance, a DAO may be built to operate using a particular voting structure. Still, this structure may evolve over time due to members' interactions with the system, resulting in the emergence of new features. This approach – "transformative emergence" – may result in the growth of the DAO's governance structure, possibly enabling it to better serve its stakeholders and members.

Through the use of a DAO organizational structure, blockchain technology enables owners to replace agent-managers with smart contracts (Murray et al., 2021). The democratization of operational choices by means of voting structures in a DAO reduces the costs incurred by conventional businesses for agency supervision. The cost is reduced owing to the elimination of intermediaries. It may come at a far higher price, though, to do away with management altogether. The elimination of management in "The DAO" prevented the organization from responding rapidly to acute crises (Schmitten et al., 2022). One solution proposed by Murray et al. (2021) is that enterprises may reduce the expense of monitoring agent-managers by democratizing fundamental operational choices by leveraging blockchain technology, in conjunction with retaining agent-managers' capacity to act in the case of certain exceptional incidents.

A significant obstacle is lobbyists' ability to hijack voting processes, which may lead to a polarized majority-driven critical juncture (Zachariadis et al., 2019). This may be detrimental to the objective of encouraging communal decision-making and stewardship. In addition to being decentralized, the administration of permissionless ledgers is governed by a form of negotiated, politically assured unanimity (Zachariadis et al., 2019), which may restrict the power of specific parties. To mitigate the susceptibility of voting methods captured by lobbyists, DAOs might

include more safe and transparent voting mechanisms, such as cryptographic protocols to assure the validity and confidentiality of votes. DAOs could also embrace a more varied and inclusive decision-making process, such as multi-stakeholder models that encompass a variety of perspectives and interests. The chosen voting structure directly informs the management practices within DAOs. Whether it's through mechanisms like “One token, one vote” or “quadratic voting,” management practices are shaped to either centralize power within a select few (whales, i.e. individuals holding a large portion of tokens) or democratize it to give every member an equal say.

4.2 Proposal management

The second recurrent theme comprises three aspects of proposal management: proposal development, proposal participants, and proposal purpose. This theme dictates how proposals are introduced, discussed, and finalized within a DAO. Blockchains' adeptness at methodically documenting, monitoring, authenticating, and summarizing diverse data types (Felin & Lakhani, 2018; Lumineau, Wang & Schilke, 2020), could reflect in the advanced systems for managing proposals found within DAOs. The management practices ensure a balance between swift decision-making and comprehensive community involvement. How proposals are developed, the roles and hierarchies established among participants, and the overarching purpose of the DAO intertwine to dictate the way decisions are made and operations are managed. Elements like “Consensus periods,” the involvement of specialized “Committees” or a centralized “Council,” and a focus on “Emergent roadmap creation” or “Fund running costs” all interplay. This triad ensures that the management practices of a DAO are anchored to its mission while being agile and responsive to its members' inputs and needs. The participants discussed at length the process of the proposal development.

4.2.1 Proposal development

DAOs' primary value lies in allowing members to participate actively in decisions, embodying the stewardship theory's emphasis on collective, altruistic action toward a shared goal (Davis et al., 2018). This participative decision-making process is contrasted with the agency theory's focus on individual actors' opportunistic behaviors, necessitating controls and incentives to align interests (Bosse & Phillips, 2016). This is achieved by generating proposals on which other members may vote (El Faqir et al., 2020). Consistently, four components were identified as impediments to proposal management in the data: (1) consensus periods, (2) standardizing proposals, (3) compensation, and (4) veto power.

(1) Consensus periods – Highlighting the stewardship theory's advocacy for collective decision-making (Davis et al., 2018), the pursuit of consensus in DAOs mirrors this philosophy by emphasizing the importance of agreement and collaboration among members. However, the challenges in achieving consensus reflect agency theory's concerns about divergent interests and the difficulties in aligning them within diverse groups (Cuevas-Rodríguez, 2012). According to Hsieh, Vergne, Anderson et al. (2018), social consensus is the method through which members vote on suggestions voluntarily submitted by members. However, current literature fails to highlight the challenges associated with achieving consensus in a timely manner. If obtaining consensus necessitates a lengthy process, the progress of the DAOs may be impeded. This phenomenon is well expressed by one DAO's community manager (P4):

> "*We have a consensus period that is often very challenging, especially when the matter is highly contentious and disputed. There are some things that we continue to debate for months. It is something that the whole DAO is considering and debating, and we take time to find a consensus.*"

Researchers discovered that as group size rose, the level of consensus amongst members about a problem's solution reduced, followed by a rise in the number of individual member contributions and thoughts (Hare, 1952).

Due to the sheer scale and geographical accessibility of DAOs, heterogeneous membership is common. According to one DAO creator (P10),

> "*with DAOs, you can easily pool diverse global talent. If we had been a conventional organization, I would not have had access to our designers in Serbia, our coders in Lagos, or our advisers in Brisbane*."

In addition, corporate governance research suggests that diverse directors offer diverse opinions in board meetings that might create friction and prolong the decision-making process (Anderson et al., 2011), which may explain the protracted nature of consensus formation in DAOs. Nevertheless, Rock and Grant (2016) maintain that diverse teams outperform homogenous teams and are more likely to evaluate data regularly and maintain objectivity. While the assertion that diverse teams tend to outperform homogenous ones is grounded in several studies (e.g. Van Knippenberg et al., 2004; Rock & Grant, 2016), it's pivotal to understand the nuances in the context of DAO governance. Diversity in teams often results in varied perspectives, leading to more innovative solutions and comprehensive decision-making (Rock & Grant, 2016). However, in the realm of DAOs, which operate on consensus mechanisms, the interplay between diversity and governance can be multifaceted. For instance, a diverse DAO membership might bring to the table a rich tapestry of cultural, geographical, and professional backgrounds. Such diversity can enrich discussions and foster unique solutions that a more homogenous group might overlook. On the other hand, too much diversity without adequate conflict resolution mechanisms might pose challenges in reaching consensus, leading to potential gridlocks (Mannix and Neale, 2005). Thus,

DAOs face a trade-off between the benefits gained from diverse global talent and the speed of decision-making.

Furthermore, while diversity can be a strength, it's crucial to distinguish between tokenistic and substantive diversity (e.g. Rixom et al., 2023). Merely having diverse members doesn't necessarily guarantee the actual inclusion of diverse viewpoints. It's the active engagement and incorporation of these varied perspectives in decision-making that ultimately drives the effectiveness of a DAO. In light of the above, the statement about the superiority of diverse teams in DAO governance is context dependent. It underscores the importance of not just promoting diversity, but ensuring that diverse voices are truly heard and integrated into the governance processes. Future research might delve deeper into understanding the optimal balance and interplay between diversity and efficient DAO governance.

(2) Standardizing proposals – Participants voiced concern about the subjective nature of proposal writing. Depending on the wording of its ideas, developers may interpret them in a way that goes against the member's stated goals. As noted by a DAO co-founder (P20):

> "*There are so many possible outcomes that if you don't have a stringent, almost computer program-like definition of the proposal, then there are so many potential queries that you don't know how to answer and it can be quite subjective*."

According to Aragon (2022), proposals should represent fully formed, post-brainstorming concepts that are ready for community evaluation. Typically, proposals should contain a title, brief explanation, scope, metrics or key performance indicators, technical definition, team description, and further stages. The need for standardizing proposals speaks to agency theory's concerns regarding the clarity and uniformity of expectations between principals and agents (Eisenhardt, 1989). By creating clear, standardized proposal formats, DAOs aim to reduce the ambiguity and

misinterpretation that can arise in principal–agent relationships, aligning with agency theory's emphasis on role/contract specificity to mitigate agency problems (Izhakain & Zender, 2017; Kim & Mahoney, 2005).

(3) Compensation – DAOs provide value creation in the context of the gig economy, an online labour market that allows principals to delegate one-time tasks to freelance employees (Braun et al., 2022). The usual procedure for this in DAOs is that the gig seeker posts a proposal outlining the desired job and desired payment. In the words of a DAO general manager (P1): "*People submit proposals to go do work, and the compensation that they request is anything from USD coin [USDC] to Ethereum [ETH] to a native token and oftentimes a mix of at least two.*" A DAO strategy head (P14) illustrates to clarify further:

> "*A member of our group proposed developing a dashboard for the DAO; in their proposal, they detailed what would need to be done and how much money would be needed. The majority of us voted in favour, and the person was sent USDC.*"

These intriguing findings demonstrate that the DAO ecosystem may create new labour markets inside the economy. The aspect of compensation directly ties into agency theory's perspective on incentivization as a method to align the interests of different parties within an organization (Kim & Mahoney, 2005). The use of proposals for task and reward structuring within DAOs embodies this principle by using incentives to ensure that the contributions of members are aligned with the organization's goals.

(4) Veto power – In corporate governance, board members are held accountable for executive choices; hence, they have the authority to reject executive decisions (Boyd et al., 2011). Some DAOs have councils that serve as a central authority, comparable to corporate boards. These

councils may have the authority to reject proposals that have received majority support. A DAO consultant (P19) explains this:

> "*Some DAOs have a council that oversees the DAO and can veto some things like NOUNS DAO. Councils are popular now because there are not enough DAOs in practice to show that they don't need a council and that bad actors can't infiltrate the DAOs*."

Nevertheless, some DAOs have a different perspective on this, as a DAO founder (P9) explains:

> "*We encourage people to vote. We encourage people to submit proposals. We don't veto individual proposals, regardless of how we feel about them. We just give feedback on whether they have enough information to go to vote.*"

Existing research indicates that committees with veto authority take longer to make decisions, produce less consensus, have much more power than committees without veto power, and are significantly less inclined to compromise than committees without veto power (Kagel et al., 2010). Though veto power is required for boards due to their fiduciary responsibility, in DAOs, it may be seen as an effort to centralize the DAO and usurp members' authority.

The existence of veto power within some DAOs mirrors traditional corporate governance mechanisms, embodying agency theory's emphasis on oversight and control mechanisms to mitigate risk and ensure alignment with stakeholders' interests (Bosse & Phillips, 2016). However, the discussion around the appropriateness of veto power in DAOs also reflects stewardship theory's focus on empowerment and trust in collective decision-making (Davis et al., 2018), questioning whether such centralized control mechanisms are necessary or effective in decentralized contexts.

4.2.2 Participants

The structuring of participants within DAOs, through committees, councils, founders, and members, can be analyzed through the lens of agency and stewardship theories. Stewardship theory supports the decentralization of decision-making authority, believing that empowered individuals will act in the best interests of the organization (Hernandez, 2012). In contrast, agency theory highlights the potential for conflicts of interest and the need for mechanisms to align the interests of various parties (Jensen & Meckling, 2019).

Since there are no conventional organizational frameworks for DAOs, they are free to organize themselves as they see fit (Ding et al., 2021). DAOs may decide who receives posting and voting privileges for proposals. Our data analysis revealed four distinct groupings, comprising committees, the central council, the founders, and the members.

Committees are sometimes referred to as guilds, pods, or teams by the participants. The purpose of committees is to segment groups of members by function within which proposals and votes are encapsulated. For instance, legal specialists would serve on the legal committee, marketing specialists on the marketing committee, etc. A DAO co-founder (P7) explains: "*Our voting and proposal structure is within pods, working groups. I don't have developers voting and proposing on what the designers are doing. I don't think it makes sense*." Another expounds (P20):

> "*We call them guilds, which adds to the complexity of various terminologies, but I like it a lot because, despite having worked on DAOs for years, I believe the DAO should be utilized as little as possible since it requires a great deal of coordination*."

P20 then draws comparisons from political science:

> "*Elections in nations, for instance, do not occur daily. Likewise, if you consider constitutional amendments, you do not implement them every day. Therefore, I believe that establishing committees or guilds is quite important since you can then keep them in check*."

By delegating authority to these subgroups, DAOs decrease the number of community-wide votes required and the amount of time spent on ineffective debates.

In contrast, a central council functions more like the board of directors or the executive suite in a conventional business. Some DAOs only allow central council members, who have been chosen by the DAO's founders or members, to cast votes. One DAO executive (P14) exemplifies this:

> "*All decisions are made by the council that were hand-picked by the founders for their expertise… we have a council of individuals who all come from different backgrounds – from development, from art, from operations, from finance – who help guide the direction of the decisions that we're making.*"

While some scholars (e.g. Murray et al., 2021) argue that a DAO may help solve agency issues, the presence of a central council in certain DAOs reintroduces the agency problem.

Occasionally, DAOs begin relatively centralized owing to the work and ideas of their founders, but the intention is to transfer it over to the community progressively. A member of a DAO core team (P5) remarked that this is why founders often submit most proposals in the early phases:

> "*Since the founders came up with software idea, they do put a lot of proposals forward when it comes to creating the software. However, we expect that when the DAO grows, the participation of members will be higher*."

Similar sentiments were echoed by a DAO founder (P17):

> "*We don't have much in the way of community proposals. We've been sort of building up our investment portfolio. So, we've been managing it for the most part, whereas what we're trying to do now that we've built up that portfolio is to then distribute that power and say*

back to our stakeholders that we will be allowing the community to make proposals and also there'll be proposals."

However, the most straightforward approach is to provide every member with the opportunity to engage. According to a DAO member and consultant (P2): "*Any token holder can send a proposal for budgets, and everyone gets to vote on it.*"

4.2.3 Purpose

Investors in a DAO may cast votes, validate white papers, and contribute to the organization's growth and innovation by participating in a wide range of activities and submitting proposals (Santana & Albareda, 2022). Although no specifics are provided, it appears to imply that proposal submissions aid in the development of the DAO. Study participants elaborated on the aim of the proposals, including the creation of emerging roadmaps, the achievement of objectives, and the funding of operating expenses. The following claims serve to demonstrate this inference:

> "*We want to allow for an emergent roadmap, so we have anything from products and services, anything that's kind of community-based, anything that would require capital go and just experiment with, we're open to trying that out.*" (P9)

Others echo this but with a focus on the treasury function: "*There are proposals that people can do and put forth kind of [sic] our treasury to go accomplish a variety of goals*" (P4), and on finance: "*The proposals are intended to finance the primary costs of running the DAO*" (P16).

The DAO's proposal development process illustrates how emergent structures may be produced by the interaction of individual members (Kempton, 2022). For example, when members submit and/or vote on proposals, the DAO as a whole may adapt and grow in response to their ideas and contributions. Such transformative emergence (Kempton, 2022) may lead to the formulation of

new roadmaps, the attainment of goals, and the financing of operational expenditures, all of which can assist the organization's innovation and growth. In addition, the manner in which DAOs organize themselves, such as through committees, central councils, founders, members, or any combination, can be viewed as an example of transformational emergence, as the roles and responsibilities of these groups can change over time based on the organization's needs and objectives.

These declarations illustrate the necessity for proposals in order to keep a DAO running; from securing operating funds to formulating strategy, it takes a collaborative effort. Agent-managers play a crucial role in making timely and adaptable choices (Murray et al., 2021). Since proposals are required for the majority of decisions in DAOs, adapting strategies would take too long and diminish their competitive edge.

In contrast to the agency theory, the stewardship thesis holds that managers operate in the firm’s best interests and not their own (Grundei, 2008). Participants give serious consideration to issues like consensus periods, standardization, compensation, and veto power. Therefore, they are positioning themselves as stewards of the organization and are motivated to promote best practices for enhancing DAO performance via proposal creation. For instance, to ensure the success and efficacy of the DAO, its founders (acting as stewards) have considered issues, including establishing uniform guidelines for the submission of proposals. As previously indicated, the DAO may decrease agency expenses (Murray et al., 2021); however, it does so because all members are token holders and, as a result, they are stewarding the organization for maximum efficacy. Those who make decisions inside the DAO are also members and token holders, giving them a vested interest in its success.

This is further exemplified when members of the DAO deliberate the purpose of proposals and express confidence in the good intentions of members. They trust the members' ability to craft proposals that will result in emerging roadmaps and optimize the DAO's benefits. In stewardship theory, this level of trust between management and shareholders is critical (Grundei, 2008).

A vulnerability in the code might make a formerly illicit activity permissible "within code"; hence, proposal management is another crucial problem (Zachariadis et al., 2019). The 2016 DAO collapse illustrated the dangers of embedding all contractual agreements and organizational links on the blockchain. Smart contracts pose problems regarding the governance mechanisms around the testing, approval, and certification of smart contracts on blockchain platforms to assure their quality and security (Zachariadis et al., 2019). DAOs might develop explicit and open governance mechanisms, including the testing and certification of smart contracts prior to deployment. This might require implementing peer review or third-party certification to guarantee the security and lack of vulnerabilities in smart contracts. DAOs should also include procedures to guarantee that smart contracts are regularly inspected and assessed for potential risks and vulnerabilities.

The purpose behind proposal submissions in DAOs reflects the principles of stewardship theory, as it emphasizes collaborative effort toward the organization's growth and innovation. This collaborative effort underscores the stewardship model's belief in the intrinsic motivation of individuals to contribute positively to the organization (Bernstein et al., 2016). However, the need for proposals to manage operational funds and strategic directions also touches upon agency theory's concerns about ensuring that the agents' actions align with the principals' (token holders') interests (Bosse & Phillips, 2016), showcasing a blend of both theories in practice.

4.3 Token management

Over the last few years, following the first DAO crisis, literature has emerged (Bersani, 2021) that has underscored the importance of token management, including the relevance of separating the governance token from the liquid token. Study participants perceive three core pillars as crucial for effective token management in DAOs: separation of the governance token, token redistribution, and tokenomics. Token management is pivotal in DAOs, particularly in the context of stewardship and agency theories. The separation of governance tokens from liquid tokens addresses agency theory concerns of aligning incentives and reducing conflicts of interest (Bosse & Phillips, 2016).

4.3.1 Separation of the governance token

The consequences of having individuals holding a large portion of tokens (known as whales) and single token vulnerabilities have caused DAO founders, consultants, and enthusiasts to devise new ways of protecting members and safeguarding the treasury. One of the ways this has been done is by separating governance tokens from liquid (economic) tokens. Agency theory is evident in the separation of governance tokens, as it deals with the issues arising from concentrated token ownership (whales) and the associated risks (Liang & Chin, 2016). The separation of tokens has also tasked founders and consultants with developing innovative ways to distribute the governance tokens. Our study identified two common paths: staking mechanisms and tying them to investment.

It's paramount to emphasize that governance tokens, unlike mere liquid assets, play a critical role in DAO ecosystems, directly influencing the decision-making process. Their direct tradability in crypto markets makes them susceptible to short-term market fluctuations. DAO members can indeed sell these tokens in the market, but founders often strategize to deter such sales, ensuring long-term commitment to the DAO's objectives. One prevalent strategy employed to achieve this is the staking mechanism.

Staking mechanisms that lock liquid tokens would disclose members' commitment to the DAO, therefore screening out speculative participants (or "paper hands"). It is also a means of combating voter apathy since only long-term investors would be eligible to vote. In the words of one DAO founder (P10):

> "*[I]n order to get the governance rights, you have to forsake and stake the token to get another governance token, which allows you to govern, but again, you're also foregoing your economic rights. So in that essence, it is nice to keep them separate.*"

In a similar vein, a DAO co-founder (P6) details:

> "*What has now been kind of a standard for governance tokens is separating the liquid token from the governance token. And one protocol or one code aspect that solved it perfectly is the V token, which means that users will then take the liquid token that they buy off the market or receive from the treasury or get it from the IDO, and they would lock it.*"

Staking is the process of locking tokens in a mechanism. This is the process of keeping tokens in a crypto wallet in order to contribute to a DAO's activities. Staking is not exclusive to any particular blockchain and is the process of locking tokens to demonstrate commitment and support for a project or protocol. Staking mechanisms that lock liquid tokens reflect a stewardship model where members demonstrate a commitment to the DAO's future, aligning their personal interests (Davis et al., 2018) with the DAO's success. While staking can be performed on various blockchains like Bitcoin, Ethereum, Solana, or Polkadot, the fundamental principle remains consistent: tokens are locked in a mechanism, typically a wallet specific to that blockchain, to contribute to a DAO's activities. Typically, participants are incentivized to retain and deposit tokens. Rewards in a DAO are variable, but often related to the distribution of governance tokens. As highlighted by P6 in this comment:

"*They would lock it in this staking mechanism, which is not necessarily reward-based, it doesn't necessarily require you to give them more of the liquid token, but it will give them another version of that token which is purely governance.*"

Forgoing their liquid tokens means that they have "*some skin in the game*", as described by a DAO co-founder (P20). Founders often leverage the staking mechanism as a strategy to encourage members to hold onto their governance tokens, with the aim of reinforcing commitment and warding off any short-term speculative intent. This strategic decision not only preserves the integrity of the DAO, but also aligns the interests of its members with its overarching objectives.

Furthermore, DAOs could distribute governance tokens proportionally to the amount invested in the liquid token. As one DAO co-founder (P9) outlines: "*You get governance tokens in return at 1000 tokens to 1 ETH exchange rate. So, if you contributed one ETH, you would get an NFT, but you'd also get 1000 tokens in return.*" Although this method is equitable and simple, it offers little protection against disinterested members or short-term investors. This brings up the problem of voter apathy once again (Tse, 2020).

4.3.2 Token redistribution

Generally speaking, DAOs are not compelled to redistribute tokens to the community. Typically, a token's monetary worth is achieved by its liquidation. However, DAOs often indirectly redistribute tokens to members and the larger community through bounties, staking pools, rewards, tips, and employment contracts.

DAOs establish their own microeconomies by issuing bounties to members to accomplish mission-related tasks (Patey, 2021). According to one DAO's co-founder (P9), this can encompass several tasks: "*There are different bounties, like proofreading a blog post or copywriting for our*

website, engineering, marketing." DAOs' microeconomies and incentivization strategies reflect agency theory's focus on aligning individual behaviors with organizational goals through incentives (Maestrini et al., 2018). Further, the introduction of the DAOs has introduced bounty hunters into the DAO ecosystem. However, this, in the words of a DAO founder (P10), is not always favorable:

> "*I'm not even a huge fan of bounty systems because it's like, first of all, it puts people in a weird space where it's like there might be multiple people doing work for one bounty payout. Only one will get compensated, and I tried to avoid those. And then it's also the people coming to do the bounties; they don't have the context of the whole ecosystem that maybe a full-time employee of a company would or has been at a place for one to two to three years or whatever. They're just coming in to do the bounty.*"

A criticism of the gig economy is the existence of information asymmetry. Gig workers lack access to all information and tasks are typically opaque, leaving room for miscommunications and mistakes (Bergvall-Kåreborn & Howcroft, 2014). Those who enter the DAO purely for the bounties often lack the context to execute the task effectively. The challenges associated with the gig economy, such as information asymmetry and the potential lack of context for bounty hunters, reflect agency theory's concern over the clarity of roles and responsibilities among decentralized agents (Youssef & Sikdar, 2020).

As mentioned earlier, token holders stake their tokens in a DAO pooling to partake in governance, incurring an opportunity cost as they forgo opportunities to stake their tokens in a different platform or liquidate their tokens. Therefore, DAO experts suggest that DAOs must compensate the contributors with benefits (Benligiray, 2021). DAOs have devised innovative

approaches to accomplish this. For example, one DAO (P16) diversifies its investments by implementing staking for an array of tokens:

> "*People can stake their Metaverse tokens, like Starlink, SANS, MANA, Ethereum, BNB, and ApeCoin. And what we do is we take those tokens that have been deposited in our staking pools, we generate profits, and we distribute those profits back to those stakers*."

This allows members to stake additional tokens or cryptocurrencies in addition to DAO tokens, diversifying the revenue streams of DAOs (especially investment DAOs) and reducing the risk of their investments.

In addition, some DAOs have adopted the practice of tipping, with tips being awarded to members who make contributions without seeking any kind of compensation in return. This fact is highlighted by a DAO community manager (P4): "*We do a lot of circular economy. It's very cultural just to see tips, people tipping each other*." The founder of another DAO (P11) notes that certain DAOs are designed with reward incentives in mind:

> "*You'll be rewarded based on your achievements. You'll be able to trade those tokens that you accumulate for actual merchandise. And they'll be used in levelling up the NFT, which will help you generate more token rewards.*"

As a result, all of the above would encourage members to contribute to the development of the DAO.

Finally, DAOs may also provide more than simply gigs and tasks. For example, a DAO may provide full-time employment for professionals like developers, software engineers, community managers, operation managers, and chat moderators. As one co-founder (P9) mentions: "*There are some people that are earning steady streams, which they get paid monthly*

for work they're doing." However, this may have inevitable repercussions, such as hurdles associated with working for an unregistered entity and restrictions on professional advancement.

4.3.3 Tokenomics

Tokenomics is an essential element of every blockchain initiative. It analyzes how crypto tokens are utilized inside the blockchain ecosystem, their purpose within the venture, and how they are created to incentivize certain activities. For instance, they may be built with a set supply such that there is neither inflation nor deflation (Kampakis, 2022). According to a DAO investor (P12):

> "*Most of them [tokens] are fixed supplies; Some the deflationary orientation is applied [sic]. The only one that is different from the norm is inflationary because of its design. It has rebases, and it also has voting that gets flow out. So, it's kind of inflationary in that form of design. So, looking at your tokens as a percentage of the market cap is better*."

With an inflationary value, tokens function more like fiat money; they provide the issuer more freedom and minting is ongoing. Whereas static supply with a limited token capacity in conjunction with controlled supply updates may result in modest surges in demand, hence driving up the price (Kaal, 2018). Price volatility is inherent in these models, as market reactions to supply and demand dynamics can significantly impact token holders, especially in governance tokens that act as a representation of decision-making power.

Conversely, a deflationary approach entails tokens being burnt over set time intervals to reduce the total supply. One DAO founder (P11) discusses their strategy:

> "*…a deflationary amount, we're not going with like some large amount because the goal is to ensure that we have enough to just sustain the scalability of the project without diluting*

the actual value of the tokens and how they will be exchanging them for merchandise and how long it takes to acquire them."

With a deflationary quantity, it is anticipated that prices would rise due to token circulation's inherent scarcity (Kaal, 2018). This scarcity can lead to higher volatility as any small demand change can cause significant price swings. Token holders need to be wary of these fluctuations as they can alter their stake and influence within the DAO. This price volatility can impact the decision-making process within a DAO, especially if token value significantly affects voting power or if the value fluctuations deter participation due to economic apprehension.

The utility of the DAO's tokens and incentive to hold, among other factors, play a significant role in the success of a DAO. There are innumerable ways that this can be done, as stated by one DAO's core team member (P5):

"*There is some sort of strategy to unlock the money the longer they stay in the DAO and participate as traditional VCs do, but in the case of our DAO, when they are building a product like software, the incentive is to stay and build the project.*"

However, some, such as a DAO founder (P11), connect it to the services that their DAO provides: "*We offer a service and want to focus primarily on utility and the people that actually are looking to improve their lifestyle and wellness first.*" Regardless of the DAO's goals and objectives, a designed incentive or utility is essential to its success.

One of the most contentious debates amongst DAO administration and governance participants is preventing the "whales" from seizing control. Whales are characterized as "above-average token holders" (Barbereau et al., 2022, p. 20). They are seen as a powerful minority who own many tokens and can influence votes and seize power. This is comparable to controlling shareholders in a conventional corporation. Due to the concern of centralization and security inside

the DAO ecosystem, whales are a significant issue with DAOs. When questioned about the influence of whales, one participant (P5) comments that it is the normal nature of business and nothing is to be done: "*Two entities hold a large portion of the tokens and technically have control over the votes, but we believe that it is fair and is the nature of a DAO business.*" Others, including the general manager of the DAO (P1), are working to mitigate this risk:

> "*A lot of members have delegated their votes to one specific founder and, now, that one founder has outsize power and influence over decision-making. I think that's an issue. I think it creates a disincentive for the other founders to vote when one founder has too much influence and power. So, I think that the function, the calculation of how much voting power you get from the delegation, needs to change to create more parity across the founders.*"

On the other hand, one DAO (P16) adopts democratic mechanisms to address this risk:

> "*One of the biggest issues can be with whales voting and being able to control decisions. What we offer with our democratic DAO takes that worry away and allows everyone to have an equal say in the DAO. And that's what allows it to be a fairer system*."

While one DAO (P6) gradually introduces power to these whales:

> *"Whales are problematic because you don't want people to have too much effect over the DAO itself. The tokens that you are getting – let's say the team is allocated 20 per cent and the investors are getting allocated 15 per cent – it's vested over time, meaning they will only, both the team and investors, will only start receiving their tokens six months after the token is launched.*"

This strategy, however, only works in delaying the issues associated with whales and reducing impact in the short term.

Additionally, there's a security risk associated with whales in DAOs without multi-signature (known as multisig); a hacker who gains access to even a single whale's account might potentially control the DAO's voting process and its treasury. There have previously been attacks, including acquiring majority ownership and exploiting governance norms for financial benefit. For example, in Beanstalk, an adversary was able to steal almost $182 million. The attacker received a flash loan using a decentralized system, converted it for sufficient beans tokens to achieve a 67 per cent voting share in the project and accepted a self-made proposal to transfer the treasury cash to their own wallet (Faife, 2022).

Token management is particularly crucial since tokens can be used as incentives for participation and a way to improve governance. However, token holders with a significant stake may excessively influence decisions, potentially resulting in centralized control (Zachariadis et al., 2019). As a result, DAOs face a considerable challenge balancing shareholder engagement and avoiding centralized control. Beyond tokens, DAOs might explore implementing various incentives to encourage involvement and engagement. These might include social benefits, such as acclaim and reputation within the community, or non-monetary incentives, including access to exclusive resources or networks. In addition, DAOs should consider incorporating tools to avoid the concentration of token ownership in a small number of persons or groups, like token distribution limitations and systems to promote widespread involvement in governance.

Token management plays a pivotal role in shaping management practices within a DAO. How governance rights are acquired, whether "Earned through staking mechanisms" or "Tied to investment," dictates the management practices that incentivize participation and behavior. Strategies, such as "Whale management," are management practices specifically designed to counterbalance power and ensure fair governance. Additionally, sudden spikes or drops in token

value could shift the balance of power within a DAO, especially if large stakeholders/whales decide to buy more tokens or divest during a value surge or decline.

While founders and advisors attempt to solve issues and weaknesses, such as the concentration of tokens among whales and chances for personal opportunism among members, the growth of DAOs also entails continual transitions. This ongoing metamorphosis encompasses the creation of new token distribution and management methods, which may be seen as instances of transformational emergence at the threshold of the DAO's interior structure. Hence, the emergence and continuous development of DAOs from blockchain technology highlights the relational and transformative character of emergence since the emerging structure is formed by the continuous modifications of its constituent parts (Kempton, 2022).

Findings from the token management domain align closely to agency theory's tenets. First, the founders are considering methods to incentivize members by redistributing tokens and earning governance tokens. Therefore, the DAO founders imply that intrinsic motivation is insufficient. Assuming these incentive-based mechanisms are put into place, agency theory may be deduced. Second, the troublesome nature of whales in a DAO suggests that members should be mistrusted and seen as pursuing personal opportunism with divergent aims. This leads us to believe that although a DAO's foundation is predicated on the idea of utopian stewardship with collaborative processes and confidence in the proposal management system, its operations are more consistent with those of a dystopian agency with activities based on mistrust and incentive schemes.

5. Limitations and Future Research

Although we investigate a relatively new phenomenon of DAOs, we acknowledge that the study may have some caveats. We recognize the subjectivity of qualitative research, the generalizability of the findings, and retrospective sensemaking. Researchers note that interviews may be subjective

and prone to alter based on the circumstances (Hammersley & Gomm, 2008). However, interviews are an effective method for gaining insights into the interviewee's opinions and would provide a vast quantity of information. Exploratory qualitative studies are used to investigate and find new constructs using interview data, which is suitable for the purpose of our study. They are appropriate for investigating a relatively new study field on DAOs where empirical studies are few, and there are no precedents for survey questions. We address concerns of subjectivity by excluding unsupported notions and requiring each researcher to examine the methodology and findings using rigorous procedures independently.

Also, we addressed issues with extrapolation from a limited sample of interviews. Our qualitative research aims to explore a new setting that can be the basis for future empirical research. This research may be used as a reference point for further investigation into the challenges of DAO governance and the formulation of related research issues.

Further, our data do not include situational reflections; our theoretical input is based on individuals' retrospective sensemaking. Thus, although participant remarks may represent a self-serving bias, it appears improbable given that they openly acknowledged issues with their current voting systems, proposal management, and tokens. To go beyond the limitations of self-reported data from the founders themselves, we advise that future research might use longitudinal studies, quantitative studies, and/or case studies to advance our investigation. This problem might be addressed by interviewing more members/investors than we have or other DAO players, such as developers, whom we have not yet covered. Thus, the investor perspective or development issues might be better comprehended. In addition, it has been shown that DAOs cannot function without the contributions of their members. Some contribute altruistically, while DAOs compensate others.

Future studies should further investigate this phenomenon and its ramifications since DAOs constitute an egalitarian system while creating their own inequities.

6. Conclusions

The purpose of this article is to investigate how existing DAOs are governed. Our investigation showed three broad themes regarding DAO governance: voting structure, proposal management, and token management. This article concludes with the following contributions. Employing an agency (Murray et al., 2019) and stewardship (Grundei, 2008) perspective, the analysis reveals that while DAOs position themselves on par with stewardship, employing systems that involve trust and collaborations, in actuality they conform with the agency perspective, ruminating about members that have outsized power (whales), and devising incentive-based strategies related to agency, equivalent to traditional corporations tying CEO compensation to stock performance in an attempt to eliminate self-serving practices. This duality illustrates that while DAOs inherently strive for a stewardship-based model of governance, emphasizing communal benefit and shared objectives (Davis et al., 2018), they cannot entirely escape the pragmatic constraints of agency theory, which necessitates checks and balances to mitigate the risk of concentrated power and align diverse stakeholder interests (Bosse & Phillips, 2016).

In delving deeper into the labyrinth of DAO governance, it becomes evident that our intention isn't to proclaim one governance structure superior to the other, but rather to spotlight the unique intricacies of decentralized governance. Centralized systems, with their streamlined hierarchies, are known for efficiency and decisive actions. However, the essence of DAOs, as revealed through our taxonomy, leans heavily toward fostering inclusivity, championing transparency, and prioritizing decisions shaped by the community. The emphasis on “Voting

Structure" epitomizes the commitment to democracy, while the intricacies of "Proposal Management" stress the significance of community-driven decision-making. "Token Management" provides a lens into the innovative marriage of economic incentives with governance, showcasing a departure from the norms of centralized models. Thus, our exploration beckons readers to navigate the facets of DAO governance, inviting them to appreciate its unique attributes in juxtaposition to centralized governance, and understand the merits intrinsic to each without inherently elevating one above the other.

The article contributes to research in governance studies, particularly in the DAO context (e.g. Murray et al., 2019). Although the significance of adopting better governance in DAOs is recognized (Zachariadis et al., 2019), empirical research on the current state of DAO governance is scarce. We assert an agency conceptualization of DAOs and existing understandings of agency theory are extended and made applicable to a new setting. We demonstrate that even in the establishment of egalitarian, democratic organizations, agency perspectives are employed through design. This study enriches existing DAO governance studies (particularly in voting structures, proposal management, and token management). While many of these studies are review-oriented (e.g. Santana & Albareda, 2022), the present investigation has expanded the agency conceptual framework by applying it to a new area and obtaining the perspectives and behaviors of DAO market-makers themselves.

It is crucial to underscore that the essence of our research not only outlines the structures and mechanisms of DAO governance, but also delves into the philosophical underpinnings that drive these decentralized entities. While our findings highlight the tension between agency and stewardship perspectives, it's essential to understand that DAOs operate in a dynamic ecosystem where traditional governance paradigms are constantly being challenged and redefined. Our

exploration serves as a beacon for future research, urging scholars to transcend conventional frameworks and engage with the multifaceted and evolving landscape of decentralized governance. As the realm of DAOs continues to expand, it is our hope that this study ignites more nuanced discussions and investigations into the intricate interplay of power, trust, and community dynamics.

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Table 1: Participant characteristics

	Previous work	Education	Relationship to DAO	DAO Type	Members of DAO	Treasury	Token/NFT gated
P1	Non-profit, Tech, PR, Web3	Business School	General Manager	Collector's DAO	~3468 members	~170ETH	NFT gated
P2	Internet/Web3 space	Masters in Arts	Member and consultant	NA	NA	NA	NA
P3	Venture Capital	Business School	Venture Capitalist	NA	NA	NA	NA
P4	Entrepreneur	Secondary education	Community Manager	Media DAO	~1,000 members	~40ETH	NFT gated
P5	Entrepreneur	No info	Member of core team	Protocol DAO	~700 members	~6,800ETH	Token gated
P6	FinTech	No info	Co-founder	Service DAO	~5,500 members	Not launched	Token and NFT gated
P7	Legal	Legal Degree	Co-founder	Philanthropy DAO	~2,000 members	~2,200ETH	Token gated
P8	Military	Business School	Owner of a DAO resources company	NA	NA	NA	NA
P9	Finance	Engineering	Co-founder	Investment DAO	~4,000 members	~1,000ETH	NFT gated
P10	Start-ups	Business School	Founder	Societal DAO	No information	No information	Token and NFT gated
P11	Entrepuener	Military	Founder	Community DAO	No information	No information	Token gated
P12	Start-up	Engineering	DAO investor	NA	NA	NA	NA
P13	Admin jobs	Secondary education	DAO bounty hunter	NA	NA	NA	NA
P14	Entrepreneur	Business School	Head of Strategy	Collector's DAO	~1,500 members	~417ETH	NFT gated

P15	Legal	Legal Degree	Co-founder	Community DAO	~1,000 members	~50ETH	Token and NFT gated
P16	Engineer	Engineering	COO	Investment DAO	~4.000 members	~2,900ETH	Token gated
P17	Architect	Architecture	Founder	Impact DAO	~150 members	~9ETH	Token gated
P18	Venture Capital	Secondary education	DAO investor	NA	NA	NA	NA
P19	Start-up accelerator	No info	DAO consultant	NA	NA	NA	NA
P20	Entrepreneur	Secondary education	Co-founder	Operating system DAO	~25,000 members	~250,000ETH	Token gated

Source: Compiled by researchers

Table 2: Findings

Themes	Second-order themes	First-order codes	Illustrative Quotes
Voting Structure	Simple structures	One token, one vote	"Every token holder gets to vote on anything in proportion to their tokens. There is no council or any board"
		One member, one vote	"We call ourselves a democratic DAO because no matter how many tokens you hold, you always have an equal vote to everyone else"
		Delegated voting	"rather useful to delegate tokens to governance power to someone to vote on your behalf on a wide range of proposals... within a proposal basis... On another proposal, you may actually know more about the matter, so you vote yourself"
	Contemporary structures	Reputation-based weighting	"We are figuring out how to use reputation-based voting. I think about it like in the US; we have one person, one vote. I'm not political at all. I don't follow politics.... So, when I vote, there's someone who's probably dedicated their whole life to political science, and I'm essentially cancelling their vote out simply because I feel like I should be voting when I am not qualified"
		Decaying model	"There's an inherent decaying model where people who are using this governance and participating in the voting mechanism will then keep on their allocated governance token. But if you're not participating in the DAO, it will start decaying over time"
		Convection voting	"having to allocate your different tokens within different proposals during a vote, and so there is a cap. So, for example, you have a maximum of 20 tokens in each one (proposal)"
		Quadratic voting	"Say there's someone who holds the majority of the votes. They should not make the decisions on their own. We implement quadratic voting so that everything is a little bit more balanced"
	Incentive-based	Voting bribing	"Some (DAOs) use incentivization to vote, but I dislike it because it leads to voter apathy which means they vote on whichever proposal they think will pass. I think it's better to have less participation but better-quality voters"
Proposal Management	Development	Consensus periods	"We have a consensus period that is often very challenging, especially when the matter is highly contentious and disputed. There are some things that we continue to debate for months. It is something that the whole DAO is considering and debating, and we take time to find a consensus"
		Specifications	"There are so many possible outcomes that if you don't have a stringent, almost computer program-like definition of the proposal, then there are so many potential queries that you don't know how to answer and it can be quite subjective"
		Compensation	"People submit proposals to go do work, and the compensation that they request is anything from USDC to ETH to a native token and oftentimes a mix of at least two"
		Veto power	"Some DAOs have a council that oversees the DAO and can veto some things like NOUNS DAO. Councils are popular now because there are not enough DAOs in practice to show that they don't need a council and that bad actors can't infiltrate the DAOs"
	Participants	Committees	"We call them guilds, which adds to the complexity of various terminologies, but I like it a lot because, despite having worked on DAOs for years, I believe the DAO should be utilized as little as possible since it requires a great deal of coordination..."

		Central council	"All decisions are made by the council that were hand-picked by the founders for their expertise… we have a council of individuals who all come from different backgrounds, from development, from art, from operations, from finance, who help guide the direction of the decisions that we're making"
		Founders	"Since the founders came up with software idea, they do put a lot of proposals forward when it comes to creating the software. However, we expect that when the DAO grows, the participation of members will be higher"
		Members	"Any token holder can send a proposal for budgets, and everyone gets to vote on it"
	Purpose	Emergant roadmap creation	"We want to allow for an emergent roadmap, so we have anything from products and services, anything that's kind of community-based, anything that would require capital go and just experiment with, we're open to trying that out"
		Accomplishment of goals	"There's proposals that people can do and put forth kind of our treasury to go accomplish a variety of goals"
		Fund running costs	"The proposals are intended to finance the primary costs of running the DAO"
Token Management	Separation of governance	Earned through staking mechanisms	"in order to get the governance rights, you have to forsake and stake that they have taken to get another governance token, which allows you to then govern, but again, you're also foregoing your economic rights"
		Tied to investment	"you get governance tokens in return at 1000 tokens to 1 ETH exchange rate. So, if you contributed one ETH, you would get an NFT, but you'd also get 1000 tokens in return"
	Redistribution	Bounties	"There are different bounties, like proofreading a blog post or copywriting for our website, engineering, marketing"
		Staking pools	"People can stake their Metaverse tokens, like Starlink, sand, mana, Ethereum, BNB, and ape coin. And what we do is we take those tokens that have been deposited in our staking pools, we generate profits, and we distribute those profits back to those stakers"
		Rewards and Tipping	"you'll be rewarded based on your achievements. Those tokens that you accumulate, you'll be able to trade in for actual merchandise. And they'll be used in levelling up the NFT, which will help you generate more token rewards"
		Employment	"There are some people that are earning steady streams, which they get paid monthly for work they're doing"
	Tokenomics	Strategy	"a deflationary amount, we're not going with like some large amount because the goal is to ensure that we have enough to just sustain the scalability of the project without diluting the actual value of the tokens and how they will be exchanging them for merchandise and how long it takes to acquire them"
		Incentive	"there is some sort of strategy to unlock the money the longer they stay in the DAO and participate as traditional VCs do, but in the case of our DAO, when they are building a product like software, the incentive is to stay and build the project"
		Whale management	"whales are problematic because you don't want people to have too much effect over the DAO itself"

Source: Compiled by researchers

Appendix

Appendix A: Frequency Analysis of Interview Themes and Codes

Themes	Second-order themes	First-order codes	Frequency
Voting Structure	Simple structures	One token, one vote	16
		One member, one vote	12
		Delegated voting	9
	Contemporary structures	Reputation-based weighting	11
		Decaying model	10
		Convection voting	8
		Quadratic voting	14
	Incentive-based	Voting bribing	7
Proposal Management	Development	Consensus periods	17
		Specifications	12
		Compensation	13
		Veto power	10
	Participants	Committees	14
		Central council	11
		Founders	18
		Members	19
	Purpose	Emergent roadmap creation	13
		Accomplishment of goals	16
		Fund running costs	12
Token Management	Separation of governance	Earned through staking mechanisms	15
		Tied to investment	13
	Redistribution	Bounties	11
		Staking pools	10
		Rewards and Tipping	13
		Employment	8

	Tokenomics	Strategy	14
		Incentive	12
		Whale Management	12

Source: Compiled by researchers

Appendix B: Distribution of Participants' Educational Background and Previous Work Experience

Category	Detail	Percentrage
Educational Background	Business School	30%
	Engineering	15%
	Secondary education	20%
	Legal Degree	10%
	Master's in Arts	5%
	Military	5%
	Architecture	5%
Previous Work	Entrepreneur	30%
	Venture Capital	15%
	Start-ups	10%
	Legal	5%
	Military	5%
	Engineer	5%
	Internet/Web3 Space	5%
	Admin jobs	5%
	Architect	5%
	Non-profit	5%
	FinTech	5%
	Start-up accelerator	5%

Source: Compiled by researchers

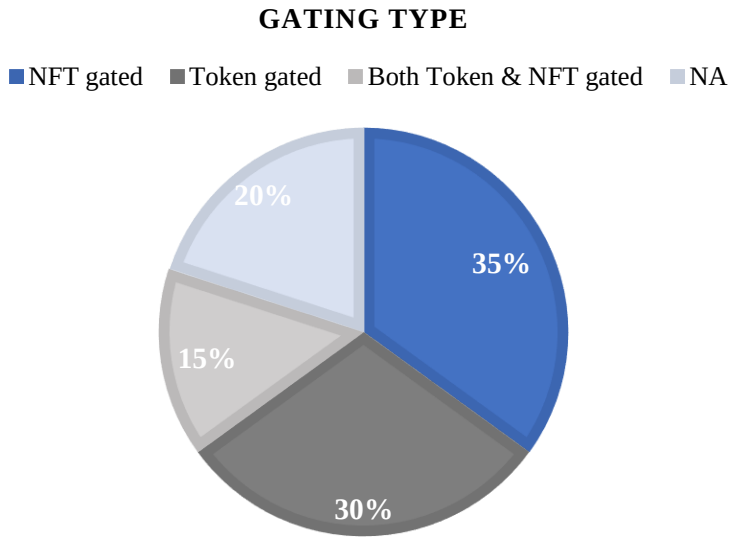
Appendix C: Descriptive Statistics for DAO Membership and Treasury

Statistic	Members of DAO	DAO Treasury (ETH)
Mean	~6,821 members	~4,608 ETH
Median	3,468 members	708.5 ETH
Mode	1,000 & 4,000	No mode
Range (Max-Min)	24,850 members	249,991 ETH
Maximum	~25,000 members	250,000 ETH

Minimum	~150 members	9 ETH

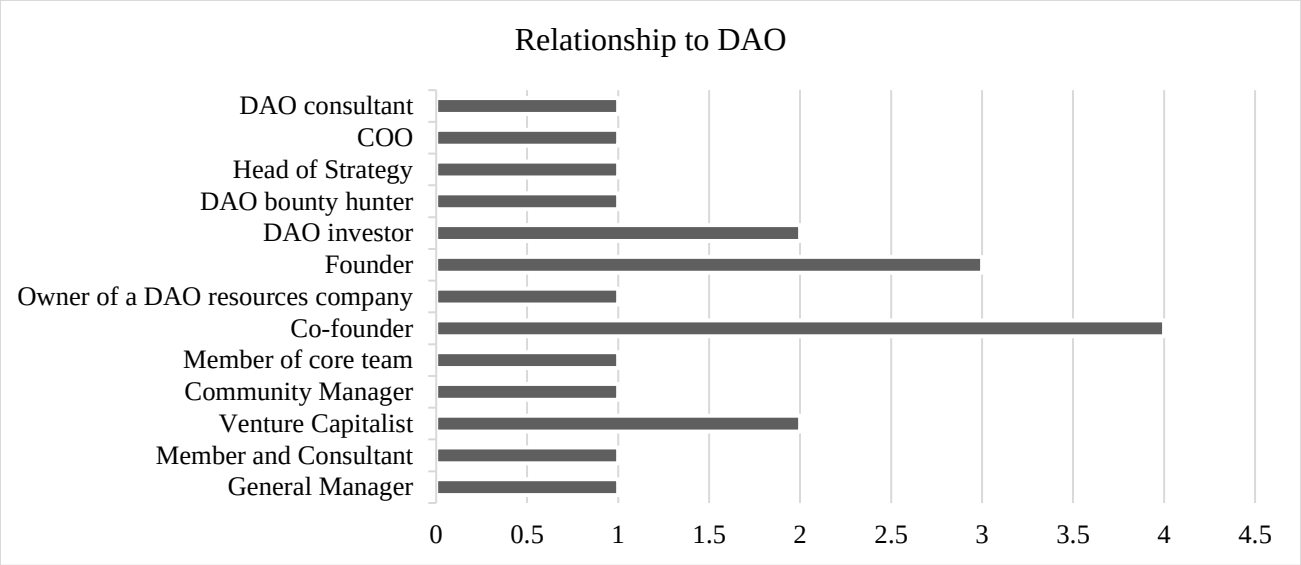
Source: Compiled by researchers

Appendix D: Pie Chart Representing Distribution of Gating Type



Source: Compiled by researchers

Appendix E: Bar Graph Illustrating Relationship to DAO



Source: Compiled by researchers