

IMPACT OF DECENTRALIZED AUTONOMOUS ORGANIZATIONS (DAO) ON SOCIETY 5.0

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ABSTRACT

Decentralized autonomous organizations (DAOs) are not a novel social phenomenon; rather, they draw inspiration from self-organizing systems and are often regarded as digital counterparts of cooperatives (Co-ops), wherein members fully own and govern the organization. The advancement of digital solutions for decentralization, such as Distributed Ledger Technology (DLT), along with the emergence of the third generation of websites (Web3) and platforms, has propelled DAOs to a new echelon. As such, DAOs represent the next generation of organizations, aptly referred to as Organization 5.0 in the context of Society 5.0. The objective of this paper is to provide a comprehensive overview of the evolutionary trajectory of decentralized autonomous organizations and their classification. The advent of Ethereum in 2015 enabled the realization of DAOs, with "The DAO" being the first large-scale example established in 2016 as a decentralized venture fund within the Ethereum ecosystem. Over time, DAOs have expanded their scope beyond fundraising and have evolved to serve various purposes. To provide a comprehensive context, the paper presents background information on the evolution of blockchain applications and discusses ethical considerations related to DAOs. In order to identify the most common categories of DAOs, this paper consults various DAO explorers and include, for each identified category, a descriptive example of a DAO. Finally, the paper concludes by offering an outlook on the future of DAOs.

KEYWORDS

DAO, Blockchain, Web3, DLT, organisations, society5.0 &social impact

1. INTRODUCTION

DAOs, or decentralized autonomous organizations, are digital entities that draw inspiration from self-organizing systems, often regarded as the digital counterparts to traditional cooperatives. The concept of DAOs has been percolating within the blockchain space for several years. However, it was not until the advent of Ethereum in 2015 that a viable implementation of the concept emerged. The inauguration of 'The DAO,' a pioneering large-scale DAO, was intended to operate as a decentralized venture fund specifically catering to the Ethereum ecosystem. Unfortunately, the project encountered an untimely hack before it could fully realize its objectives, precipitating a consequential hard fork of the Ethereum blockchain.

In the year 2021, a remarkable event unfolded in the realm of decentralized autonomous organizations (DAOs) as the *Constitution DAO* embarked on a mission to acquire a copy of the U.S. Constitution through a fundraising auction. During a span of merely seven days, an impressive cohort of over 17,000 contributors actively participated, cumulatively raising an

astounding sum exceeding \$42 million. In return for their support, participants were rewarded with \$PEOPLE tokens, a form of cryptocurrency residing on the Ethereum blockchain. These tokens would not only represent a shared ownership stake in the coveted Constitution but also endow their holders with voting rights within the DAO. Regrettably, despite the fervor and enthusiasm of its supporters, *Constitution DAO* fell short of its aspiration, conceding the auction. Consequently, the project was disbanded. Paradoxically, although its brief existence, *Constitution DAO* became as an exemplar of blockchain-based fundraising and demonstrated the transformative potential of DAOs; kindling a newfound fervor for DAOs and their governance mechanisms, inspiring an influx of interest and participation.

This article discusses the evolution of DAOs, representing on-chain entities that encompass a multitude of functions beyond mere fundraising endeavors. Notably, the inaugural DAO, "The DAO", serves as a salient historical point of reference, albeit one marred by security vulnerabilities. Recent efforts have been exerted towards a comprehensive categorization and definition of DAOs, although a definitive framework has yet to emerge. Nevertheless, common underlying purposes enable their classification into distinct clusters or categories. Subsequent sections of this article furnish a detailed backdrop outlining the genesis of DAOs, proffer insights into their classification, and scrutinize pertinent ethical considerations. The article culminates in a consultation with various "DAO explorers" to ascertain prevalent categories of DAOs and offers illustrative instances their missions, thereby culminating in succinct and precise definitions for DAO objectives.

2. FROM DECENTRALIZATION TO ORGANIZATION: THE BLOCKCHAIN AND WEB3 EVOLUTION

In the realm of *web3*, a promising evolution of the Internet is underway. This evolution centers around the principles of decentralization and user empowerment, harnessed through blockchain technology. Unlike the web2 era, dominated by corporate giants and centralized platforms, web3 champions a return to open-source ideals reminiscent of web1. In this emerging landscape, blockchain-based services play a pivotal role, providing secure, transparent, and user-centric interactions.

Web3 services leverage blockchain protocols for maintaining and updating data, with cryptocurrencies serving as incentives for active participation. Users are not just consumers; they are integral to the infrastructure, co-owning and co-governing the services they utilize. Decentralized Autonomous Organizations (DAOs) exemplify this paradigm shift, enabling token holders to engage in collective decision-making.

However, the path to decentralization is not without challenges. Issues such as energy consumption and security vulnerabilities loom, and regulatory uncertainties cast a shadow on the potential of decentralized systems. In this section, we explore the concepts of decentralization and the fundamental understanding of DAOs, shedding light on their transformative potential and the challenges they face.

2.1. Decentralization

In the early 1990s, the "cypherpunk manifesto" [17] emerged as a foundational document, advocating for the pivotal role of privacy in the evolving digital landscape. It articulated a fundamental distinction between privacy and secrecy, championing the use of encryption and open-source software as essential tools for safeguarding individuals' digital privacy. Furthermore,

the manifesto underscored the importance of anonymity within transaction systems, especially when dealing with sensitive financial interactions.

This ideological underpinning provided the impetus for the development of digital cash and catalyzed the cypherpunk movement, which would eventually lead to a transformative event—the birth of Bitcoin. Bitcoin, introduced by an enigmatic figure known as Satoshi Nakamoto, stands as a pioneering example of a peer-to-peer electronic cash system. It operates without reliance on a central authority, instead employing cryptographic techniques that provide a level of pseudonymity for users. This decentralization of control over currency issuance and transactions marked a paradigm shift in the financial world.

Building upon the foundation laid by Bitcoin, Ethereum emerged as another groundbreaking blockchain-based platform. Ethereum extended the capabilities of blockchain technology by enabling advanced computation, a feature that warrants further exploration. Ethereum's distinguishing characteristic is its support for 'smart contracts,' self-executing agreements encoded in code. These smart contracts have the potential to automate complex processes, enabling decentralized applications (dApps) to flourish and expanding the realm of decentralization to various facets of business and interaction.

Smart contracts are pivotal in fostering decentralization, as they allow for trustless interactions and automate governance processes within decentralized applications. For instance, they underpin decentralized finance (DeFi) platforms, decentralized exchanges (DEXs), and a myriad of other innovative dApps. This shift towards decentralized governance, where code and consensus replace traditional intermediaries, has profound implications for financial systems, governance models, and more.

In a broader context, decentralized systems present a compelling alternative to the centralized models prevalent among major platform providers. It is important to note that decentralization is not a monolithic concept; instead, it exhibits nuanced facets. Vitalik Buterin, co-founder of Ethereum, articulated this in [15], identifying three axes of (de)centralization: architectural, political, and logical. While blockchains exemplify architectural and political decentralization, achieving logical decentralization poses unique challenges.

Decentralized systems offer an array of advantages, including enhanced fault tolerance, resistance to malicious attacks, and a reduction in collusion vulnerabilities. However, realizing and maintaining decentralization demands robust coordination among diverse network participants while mitigating potential risks. A comprehensive understanding of the multifaceted nature of decentralization is vital in navigating the intricate terrain of blockchain and web3 technologies, where autonomy, transparency, and user empowerment prevail.

2.2. Understanding DAOs

Decentralized Autonomous Organizations (DAOs) represent a profound manifestation of blockchain technology's potential to redefine traditional organizational structures. At their core, DAOs embody the essence of decentralization, fundamentally reshaping how organizations function. Governed by code and smart contracts, DAOs provide an immutable and transparent framework for collective decision-making, resource allocation, and the enforcement of predefined rules. They are designed to minimize the influence of central authorities, reducing the risk associated with single points of failure.

DAOs, in essence, are digital entities that leverage blockchain technology and cryptocurrencies to incentivize participants while enabling community-based governance. The inaugural DAO,

known as "The DAO", served as a trailblazing example of the concept's potential. However, it also underscored the inherent risks associated with DAOs.

Nevertheless, the landscape of DAOs remains diverse, and not all entities claiming to be DAOs are necessarily active or legitimate. The term "legitimate" in this context refers to DAOs that adhere to their stated purpose, follow established governance processes, and maintain operational integrity. It's worth noting that some DAOs may be created for experimental purposes, while others may have dissolved or become inactive.

Defining the precise boundaries of what constitutes a DAO remains a matter of ongoing debate. However, a fundamental understanding holds that DAOs are online communities governed by their members through the utilization of tokens and blockchain technology. Yet, there are instances where entities are labeled as DAOs without the presence of their own governance tokens, or they may not align with the original DAO concept. This discrepancy has led to some confusion surrounding the characteristics of DAOs, prompting various definitional approaches.

In the following section, we will delve deeper into these definitions and explore the distinctions between DAOs and conventional organizational structures.

3. CLASSIFICATION EFFORTS IN DAO TAXONOMY

Classifying decentralized autonomous organizations (DAOs) is a multifaceted endeavor, with various perspectives and frameworks having emerged in the literature. This section provides an overview of previous classification frameworks for DAOs.

Regner [16] introduces a classification approach centered on assessing different properties of DAOs. This approach is particularly valuable for venture capitalists and investors seeking to evaluate their investments in such organizations. Regner emphasizes the importance of metrics in DAO assessment, with a particular focus on the purpose of the DAO as a pivotal factor. A common goal is deemed essential in defining a DAO, with the structure of the entity designed to align with its strategic objectives.

Turley [21] draws a correlation between financial-oriented DAOs and on-chain governance, contrasting them with social-oriented DAOs that engage in off-chain activities. Financial-oriented DAOs tend to be more formalized and require on-chain processes, primarily due to their management of substantial capital. In contrast, social-oriented DAOs prioritize fostering discussions and community cohesion over profit generation. Their lighter protocols and ease of creation have contributed to their growing popularity.

Wright's classification, as outlined in [22], distinguishes between participatory and algorithmic DAOs based on information systems parameters. Participatory DAOs rely on distributed consensus, akin to traditional organizations, or employ governance tokens and upgradeable smart contracts. Algorithmic DAOs, on the other hand, rely entirely on software to structure and coordinate social interactions. They may use non-upgradeable smart contracts or function as infrastructure protocols. The question of whether blockchain protocols themselves qualify as DAOs remains a topic of debate.

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

Figure 1. DAO taxonomy means and objective [19]

The World Economic Forum (WEF) proposes a taxonomy approach [19] to classify DAOs based on their objectives and means. This taxonomy comprises two key axes (eg, Figure 1): primary objective (generative, associative, or ad hoc) and primary means of achieving that objective (value transfer, social, or activity management). These axes result in nine distinct categories, though the WEF acknowledges that additional metrics, such as fund size or the use of automated on-chain processes, can further refine these classifications.

In [23], Ziegler & Welpé introduce a data-driven and comprehensive taxonomy of DAOs that rests on three primary categories: treasury, community, and governance, each with seven sub-categories and 20 dimensions (eg, Figure 2). This taxonomy takes into account the mission of a DAO, categorizing it as community building and engagement, product building and management, or investing and fundraising. Community-building DAOs prioritize awareness creation, product-building DAOs offer services, and investing DAOs seek profitability or fundraising.

Ziegler & Welpé further employ agglomerative clustering to classify DAOs into five distinct meta-types: "on-chain product and service DAOs", "off-chain product and service DAOs with community focus or with investor focus", "investment-focused DAOs", and "networking-focused community DAOs". Each meta-type possesses a set of characteristic traits, facilitating a more nuanced understanding of these organizational entities.

		Dimension	Characteristics				
Community	Membership	Access	Open (56)	Token Ownership (12)	Token Staked (1)	Invitation (3)	
		Type	Profit from Tokens (43)		Community (17)	Decider (12)	
		Is hierarchical	Yes (8)		No (64)		
	Anonymity	Anonymous (16)	Pseudonymous (53)	Known (3)			
	Meta	Contributor Rewards	REP Token (5)	Governance Token (42)	Other Token (25)		
	Purpose	Community Building and Engagement (13)	Product Building and Management (48)	Investing or Fund Raising (11)			
Governance	Token	Type	Singular (65)		Primary and Reputation (7)		
		Supply Cap	Capped (61)		Uncapped (11)		
	Process	Entry Barriers	Ownership (58)	Ownership + Application (5)	Invitation (2)	Staking (6)	Election (1)
		is fully Public	Yes (66)			No (6)	
		Execution	Automatic (20)			Manual (52)	
		has Proposal Creation Restricted	None (13)	# Tokens Owned (37)	Allowlist (22)		
	Voting	is fully On-Chain	Yes (18)			No (54)	
		Power	# Tokens Owned (60)	Per Individual (5)	# Tokens Staked (7)		
		Limits	None (66)			Per Address (6)	
	Treasury	Meta	Diversification	None (37)	Some (7)	Very (28)	
Stakes Tokens			Yes (34)			No (38)	
Capital Gain			Token Sales (10)	Services (47)	Investment Returns (15)		
Setup		Initial Airdrop	Yes (32)			No (40)	
		Initial Token Sale	Yes (43)			No (29)	

Figure 2. A taxonomy of DAOs [23].

These diverse taxonomies offer valuable insights into the complex landscape of DAOs, aiding in their classification and comprehension. Each framework brings its unique perspective, emphasizing different facets of DAOs. For instance, Regner's assessment-based approach provides a practical lens for investors and venture capitalists, focusing on the pivotal role of a DAO's purpose. Turley's classification highlights the contrasting characteristics of financial-oriented and social-oriented DAOs, shedding light on their operational nuances. Wright's distinction between participatory and algorithmic DAOs delves into the technical underpinnings of these entities, enriching our understanding of their governance mechanisms. The World Economic Forum's taxonomy adopts a comprehensive approach, categorizing DAOs based on objectives and means, facilitating a broader view of their functionalities. Ziegler & Welpel's data-driven taxonomy introduces a detailed framework considering treasury, community, and governance aspects, further contributing to the granularity of DAO categorization.

However, these taxonomies are not without their limitations. The evolving nature of DAOs and the rapidly changing blockchain landscape make it challenging to devise static classifications that accommodate all variations. Additionally, the potential for overlapping characteristics among DAOs can complicate their categorization, and the dynamism of the field may render some taxonomies outdated quickly. Nevertheless, these classification efforts collectively enrich our understanding of DAOs and serve as valuable tools for navigating the ever-expanding ecosystem of decentralized autonomous organizations.

4. DATASET: DAOS EXPLORER

Despite the novelty of DAOs, there have been several noteworthy contributions to the field, although there remain unanswered questions, particularly with regard to their mission. Rather

than constructing a classification based on theory, we opted to compare the mission categories of DAOs across various "DAO explorers" - websites that list DAOs along with supplementary information or on-chain data related to governance. DAOs are typically added to these websites via applications, creator submissions, or external data.

4.1. DAO Explorer

To identify the prevalent missions of DAOs, we conducted a comparative analysis of categories derived from five distinct DAO explorers:

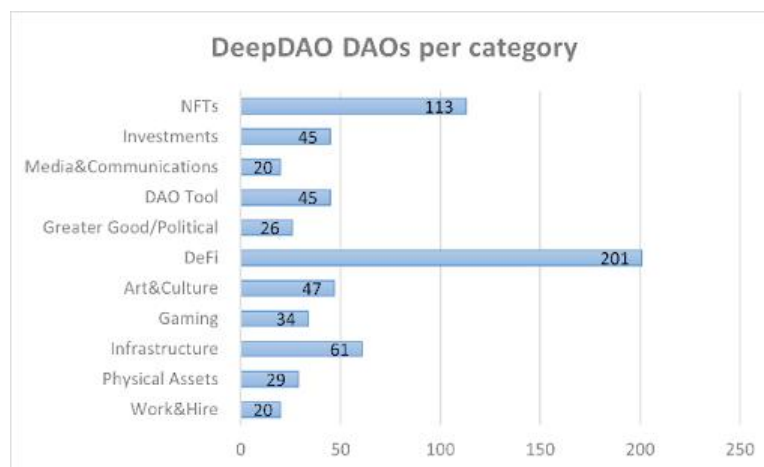
- DeepDAO [8] with 450 DAOs,
- Messari [11] with 869 DAOs,
- DAOcentral [5] with 238 DAOs,
- DAOlicious [6] with 191 DAOs
- Discover DAOs [9] with 65 DAOs

as well as two articles (from Coopathroopa [4] and The Generalist [14]). Last source did not list DAOs, So it did not appear later in the comparison.

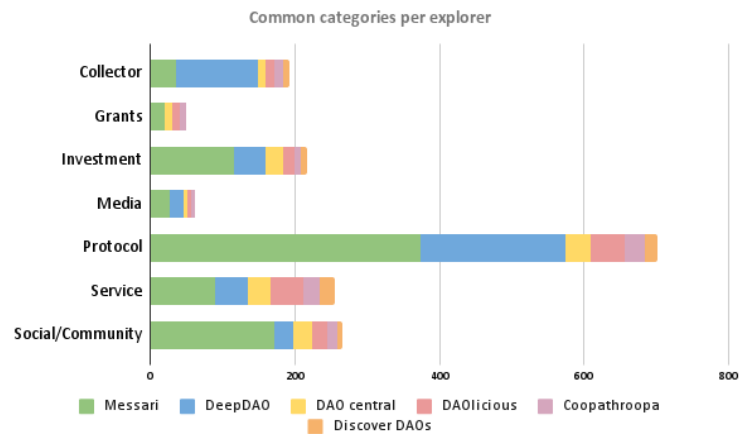
In terms of the quantity of DAOs listed, Messari holds the highest count, followed by DeepDAO. DeepDAO, Messari, and DAOcentral have independently formulated their respective category systems. On Messari, DAOs are afforded the option to propose one or two categories alongside a couple of associated "tags" during their listing application process (cf. Messari, 2023). On DeepDAO, DAOs are categorized manually, resulting in a relatively limited portion of the entire dataset being classified at present.

Notably, DAOs can be affiliated with up to four different categories, although a majority typically fall within the range of one or two (cf. DeepDAO, 2023).

The development of these classification systems was made in an iterative process of researching other classifications, classifying DAOs, and discussing the results. This iterative approach ultimately yielded a total of 11 distinct categories (eg, Figure 3.a). It is reasonable to assume that similar methodologies were employed by other DAO explorers in their category creation endeavours. In the end, between 5 and 12 categories were listed on the different explorers.



(a) DeepDAO categories classification of DAOs.



(b) Illustration of common categories per explorer

Figure 3. Categories distributions.

The distribution of DAOs across various categories provides an initial insight into the prevailing missions. To ascertain the most common missions, we undertook a comparative analysis of categories across different DAO explorers and collated them. In Table 1, we present the most frequently occurring categories, each of which appears in at least five of the seven sources examined. The remaining categories are listed below, with those in bold recurring more than once.

Note that some categories may not bear identical labels but are considered to be closely related, based on the similarity of the listed DAOs and their corresponding category descriptions. This is represented by underlining the label that we consider to be equivalent. More precisely, this observation applies to four specific categories:

- **NFT equivalent to Collector**: the label "collector" implies generally a larger scope than just "NFT". However, nearly all listed collector DAOs focus on NFTs. It's not fully accurate, since "NFT" partially also includes projects that are issuing NFTs instead of just collecting. However, because of the overlapping, we put them in the same category.
- **DeFi equivalent to Protocol**: The distinction between DeFi and protocol DAOs may suggest the need for separate categories. However, upon closer examination of the listed DAOs, it becomes apparent that they largely align. The term "protocol" typically encompasses a broader spectrum than just DeFi protocols. Despite this, it's noteworthy that the majority of the proportion of protocol DAOs within the dataset are, in fact, DeFi applications, mirroring the composition of the listed DAOs. Consequently, we opted to merge these categories.
- **DAO tool equivalent to Service**: Generally, service DAOs can provide services to all kinds of actors, while DAO tools are restricted to services for other DAOs. However, as for NFT and Collector, both categories were merged due to the presence of an overlap area between them.
- **Greater good/political equivalent to Social**: social DAOs are not generally limited to a distinct "social" purpose (they can also be about communities in general), while political DAOs do not necessarily have a focus on social good. Despite these exemptions, the descriptions and the listed DAOs seems to match, therefore we reunite them in the same category.

Table 1. Common categories and number of DAOs per explorer

DAO explorer	DeepDAO	Messari	DAO central	DAOlicious	Coopathroopa	Discover DAOs	total	
Common categories	NFTs	113	Collector 36	Collector 10	Collector 12	Collector 12	NFT 10	193
			Grants 20	Grants 10	Grants 11	Grants 8		49
	Investments	45	Investment 115	Investment 23	Investment 17	Investment 8	Investment 2	217
	Media & Communications	20	Media 26	Media 5	Media 5	Media 5		61
	DeFi	201	Protocol 373	Protocol 36	DeFi 46	Protocol 28	Protocol 18	702
	DAO Tool	45	Service 89	Service 32	Service 45	Service 24	Service 21	256
	Greater Good/Political	26	Social/Community 171	Social 26	Social 22	Social 14	Social 7	266
Additional categories	Art & Culture	47	Impact 50	Impact 19	Culture 25	Operating Systems 7		
	Gaming	34	Product 114	Product 34	DAO Platforms 8			
	Infrastructure	61		Desci 18				
	Physical Assets	29		Education 16				
	Work & Hire	20		Special-Purpose 9				
Total	641	994	238	191	106	65	2235	
Unique (if multiple categories)	450	869	238	191	106	65	1919	

Over all explorers, there is a total of about 1900 DAOs listed in the categories, with about 300 of them listed in multiple categories on DeepDAO or Messari (see Table 1). Typically, larger DAOs appear on multiple explorers, while smaller ones are just listed once. The determination of how many of DAOs appear on multiple explorers presents an avenue for further investigation. Additionally, it warrants scrutiny to assess the extent of alignment between the DAOs categorized under the same labels across various sources.

The category that significantly predominates is "protocol" DAOs, as depicted in Figure 3.b. This observation lends support to the World Economic Forum's proposition that DeFi protocols have played a catalytic role in the DAO ecosystem's growth (cf. [19], p.11). "Product building and management", which corresponds with protocol DAOs, was also the most frequent purpose characteristic identified by Ziegler & Welpé ([23], p.7). Conversely, the categories "grants" and "media" DAOs are among the least common, representing smaller yet distinct segments. In the forthcoming section, we will delve into the analysis of various category descriptions and the characteristics inherent to the more prevalent categories.

5. THE PURPOSE OF A DAO: TOP CATEGORIES AND SAMPLE CASE

This section aims to determine the purpose of DAOs based on the category assigned to them in the explorer. For three of the top categories, we list their description, and present a sample case.

We used the seven previously identified DAO explorers that presents DAO missions in terms of categories for DAOs so the user can search across the platform. The descriptions of categories were either found on their corresponding pages themselves or in corresponding articles (cf. [8], [12], [20], [7], [21], [9], [14]). In the case of DeepDAO, we asked for the descriptions of categories via an e-mail request.

Sometimes, the description was shortened for clarity, mainly the sections with sample DAOs. In a few cases, category description was missing (it can be assumed that categories were added later), these are indicated in the data table.

Initially, our approach involved extracting the common elements within the mission descriptions. Subsequently, we summarize these elements into concise statements for each category, culminating in the outcomes of our study.

5.1. Collector

We identified the three main aspects present in the description among the multiples that overlapped (eg. Table 2):

- **community-funds for NFTs:** collector DAOs buy digital artifacts (mostly NFTs) as a community, that are usually not affordable for a single person. Pooling together funds, this kind of NFT “funds” lower the entry barriers for NFT investments. Therefore, they are also described as investment DAOs focusing on NFTs.
- **for-profit/valuable artifacts:** besides the aspect to buy highly valuable NFTs, collector DAOs try to leverage the resources of the community to identify the most promising collectibles to rise in value.
- **shared governance:** collector DAOs can have large collections that need to be curated (e.g., in certain DeFi applications, NFTs can be collateralized to earn interest, some NFTs also have voting rights attached). Therefore, the group decides on the use of the collection.

We, therefore, suggest the following mission description for collector DAOs:

“Pool together capital and resources to buy valuable artifacts (mostly NFTs) and curate them as a community to generate profit.”

Table 2. Description of **collector** categories per explorer

DAO explorer	category	description	characteristics
DeepDAO	<i>NFTs</i>	“Serve NFT technology, communities and markets, NFTs as a DeFi & governance instrument”	community-funds shared governance
Messari	<i>Collector</i>	“DAOs whose goals are to purchase highly valued collectibles and artifacts.”	community-funds for-profit/valuable artifacts
DAO central	<i>Collector</i>	“All around the world, people were marvelling at the meteoric rise in NFT prices. However, this led to blue chip NFTs like Bored Apes and CryptoPunks being too far out of the commoner's reach. To overcome this, folks started pooling together resources to buy NFTs as a DAO.”	community-funds for-profit/valuable artifacts
DAOlicious	<i>Collector</i>	“Collector DAOs are for-profit investment DAOs who invest solely into NFTs. As NFTs are slowly but surely inheriting value, be it in art, music or gaming, collector DAOs focus on curating large collections of NFTs in the hope of selling them at a later date to realise a profit. Collector DAOs are responsible for some of the largest collections of NFTs out there.”	for-profit/valuable artifacts community-funds shared governance
Coopathroopa	<i>Collector</i>	“Collector DAOs seek to curate which NFTs have long-term value.”	community-funds for-profit/valuable artifacts
Discover DAOs	<i>NFT curators</i>	“Collectors band together to pool both their capital and their collections. With the resulting liquidity, they can support artists in new ways.”	community-funds shared governance

Example: PleasrDAO, an example of a collector DAO is "Pleasr". The DAO describes itself as "a collective of artists, DeFi leaders, early NFT collectors, and digital artists" that collect culturally significant NFTs (cf. [13]). The DAO was formed at the beginning of 2021 with a Twitter post, asking if people would like to form a DAO to bid on an Uniswap NFT (a decentral exchange) (cf. [13]). Later, they acquired the famous "stay free" NFT auctioned by Edward Snowden for about \$5.5 million (cf. *ibid.*). The DAO just has about 70 public-known members and therefore is an exclusive one. Pleasr fractionalizes the NFTs and distributes or resells them for charity purposes. The NFTs are collectively owned by its members, who also decide via voting upon the collection.

5.2. Protocol

Protocol DAOs are the largest – and therefore very diverse – group. They are, as already mentioned, dominated by DeFi protocols. These DAOs are a typical application of governance tokens, with the aim to own and operate a single protocol (eg. Table 3).

- **operate a protocol:** due to the variety of protocol DAOs, the descriptions are rather general.

An aspect present in all the sources was that protocol DAOs tokenize a web3 project (similar to company shares) to operate it in a decentralized manner. Members own a small share of the project and are involved in the success of the protocol via the token price, while they are not required to provide additional funding or resources.

- **shared governance:** protocol DAOs can become very big, having large treasuries and many (rather passive) members. Often, the tokens have a utility inside the protocol besides the governance function (e.g., paying fees). Despite this, just like in any other DAO, members can propose and vote on changes regarding the protocol.

Therefore, we describe the mission for protocol DAOs as:

“Operate and govern a web3 protocol as a community.”

Table 3. Description of protocol categories per explorer

DAO explorer	category	description	characteristics
DeepDAO	<i>DeFi</i>	Run Web3 potocols, assets or tools for decentralized non-custodial trading	operate a protocol
Messari	<i>Protocol</i>	DAOs on top of projects offering services to token holders like lending, borrowing, swapping, leveraging, bridging.	operate a protocol
DAO central	<i>Protocol</i>	Think money, but programmable. Protocol DAOs introduced the concept of transferrable ERC20 tokens that power all sorts of transactions in the secondary market. DAO members are able to vote on proposals to change the underlying mechanisms of the protocol itself.	operate a protocol shared governance
Coopathroopa	<i>Protocol</i>	Protocol DAOs provided a framework for any network to issue a token that was (hopefully) owned and operated by its community.	operate a protocol shared governance
Discover DAOs	<i>Protocol</i>	Decentralised projects issue governance tokens, enabling communities to weigh in on key issues and make their preferences felt through voting.	shared governance

Example: Maker DAO, maker is one of the largest DAOs in the DeFi area: They were founded in 2018 and therefore were one of the first protocols to transition into a DAO and decentralize its decision-making (cf. [10]). Maker is still partially operated by a foundation, following a hybrid approach. Many DAOs follow such a model for operational and legal reasons, however, it is controversial how far DAOs can and needs to be “fully decentralized”. Maker issuing a US-dollar stable coin (called “DAI”), backed by crypto assets. Thus, they operate as a lending platform for users who want to collateralize their crypto currency in exchange for interest. It is stabilized via a smart contract-based algorithm of minting and burning DAI tokens according to the value of its collateral. With about 90,000 token holders and a treasury of nearly \$50 million, the DAO today is very formalized and has a sophisticated governance process (cf. [8]). Maker is one of the DAOs with their voting portal, not relying on other DAO tools. Part of this is, that members can transfer their voting rights to delegates since it is an extensive task to follow all the proposals (cf. [10]).

5.3. Social

Social DAOs are also frequent, even though there are different understandings of what "social" means. They can be focused on exchange in the community, as well as following a social goal. Therefore, the actual "mission" is often very present in social DAOs, especially since, as Turley described, this kind of DAOs doesn't necessarily have financial goals or the need for on-chain management (cf. [21]). For all explorer description see Table 4:

- **like-minded community**: what nearly all social DAOs have in common is a community focus. They are a place of exchange, often these DAOs have common topics and a distinctive community culture or organize community events. The descriptions differentiated in how far these communities are open: there are DAOs, who are exclusive and need an invitation, while others are quite open and do not even require members to own the governance token to participate.
- **social goal**: many of these DAOs also share a common goal, usually in a social good area (e.g., environment, education, or art).

The mission for social DAOs can therefore be written as:

“Operate a like-minded community and follow a social goal.”

Table 4. Description of social categories per explorer

DAO explorer	category	description	characteristics
DeepDAO	<i>Greater Good / Political</i>	Work to achieve public goods and other goals beyond membership boundaries and immediate interests	social goals
Messari	<i>Social / Community</i>	Community-centric DAOs typically focused on art or culture-related projects. Members contribute and create projects together which raises the value of the social token of the DAO.	like-minded community social goals
DAO central	<i>Social</i>	Humans are social animals. We naturally gravitate toward like-minded people and form social groups around a common topic. Social DAOs exist to give these groups of people a space to interact and have discussions – similar to good ol' Reddit. For members of social DAOs, financial returns are not as important as community-exclusive perks such as early access to latest releases, member-only	like-minded community

		meetups, etc.	
DAOlicious	<i>Social</i>	Whilst many DAOs are aligned through a financial objective, social DAOs focus on social objectives. They are groups of like minded people, who are focused on a particular mission. In some instances social DAOs are akin with the exclusive social clubs we are familiar with, in others they push the boundaries of what communities can achieve.	social goal like-minded community
Coopathroopa	<i>Social</i>	Social DAOs show that there is more to crypto than making a quick buck, and that the internet is the best place to meet people with similar interests.	like-minded community
Discover DAOs	<i>Social</i>	Whether it's providing access to digital spaces or physical events, membership based DAOs are a new way to meet and collaborate with internet strangers.	like-minded community

Example: Assange DAO, this DAO has a distinct mission. They want “to inspire a powerful solidarity network and fight for the freedom of Julian Assange” [1]. Assange DAO also refers to itself as a “collective of cypherpunks” (ibid.). The DAO is governed by the holders of the “JUSTICE” token, which was issued via the decentralized token sale platform juicebox at the end of 2022 (cf. [2]). Today, the DAO has about 6,000 token holders (cf. [8,1]). AssangeDAO raised about \$55 million to bid on a dynamic NFT from the digital artist “Pak” (showing a clock with the number of days Assange has been arrested) (cf. [3]). Token holders own a share of the NFT according to their contribution. In this manner, the DAO is similar to ConstitutionDAO (which the WEF [19] describes as a “special-purpose DAO). However, after acquiring the NFT, AssangeDAO continues its community work (cf. [19], p.13). The proceedings of the NFT sale were donated to Julian Assange's legal campaign and for funding similar projects supporting freedom of speech or whistleblowing [1].

6. DAOS OBJECTIVES

The goal of this paper was to classify DAOs according to their mission. We showed, that a DAOs “purpose” is one of the most important aspects of DAO assessment. However, there is no common understanding of DAO missions. By comparing the categories of different DAO websites, we found seven common ones: collector, grants, investment, protocol, service, media, and social. Then we analyzed the category descriptions to find characteristics for each mission type and summarized them in one sentence per type.

It’s important to mention, that it’s rather rare when a DAO fits into just one mission category. DAOs are a diverse phenomenon, and every DAO is unique. Thus, it occurs that a DAO is close to two or even three categories. The mission statements are therefore to be understood as ideal-typical.

Table 5. Definition of DAOs mission as result of the study

Mission type	Statement / Description
Collector	“Pool together capital and resources to buy valuable artifacts (mostly NFTs) and curate them as a community to generate profit.”
Grants	“Pool together capital and resources for donations to promising projects to generate impact.”
Investment	“Pool together capital and resources for investments in promising projects to generate profit.”
Protocol	“Operate and govern a web3 protocol as a community.”
Service	“Aggregate the talent of the community to provide services for other DAOs and entities.”
Media	“Create media content as a community.”
Social	“Operate a like-minded community and follow a social goal.”

During the process we found several similarities with previous research: DAOs, by definition, leverage blockchain attributes to organize a community in a decentralized and autonomous way. Among them are e.g. transparency or tokenization. We agree with the findings of Rikken et al. [18], that nearly all DAOs (even though it was not a distinct category for every mission type) share two key elements: They incorporate shared governance with voting (“trusted notary functionality”) and some sort of value transfer (“storage and transfer of value functionality”) ([18], p.5).

That members pool together funds or resources and vote about their use was present in all the descriptions. What the mission of the DAO defines is rather the scope of the proposals or the options to vote on (in a grants DAO where to donate, in a service DAO for who to work for, etc.). Accordingly, the goal of a DAO is to decide as a community how to support its mission with the given resources. The mission or purpose of a DAO, therefore, is not just a characteristic, but the conceptual framework a DAO is built on.

In line with Turley's observations, we observed, that DAOs who have a financial focus (whether they are non-profit or not) tend to have a more formalized governance process (cf. [21]). In this case, these are especially the mission types collector, grants, and investment, since they allocate the funds of their members. Except for grants DAOs, the descriptions indicated a for-profit orientation and emphasized the need for a shared governance process (eg. Table 5). Protocol and service DAOs typically also need a shared treasury, even though they are not directly investing the money of members, but rather leveraging a product or skills. For these mission types, the descriptions pointed out the shared governance as well.

On the other hand, media and social DAOs usually have a non-profit aspect. Their mission rather leans towards community-building or impact and education. They can also operate off-chain. It is

therefore disputed whether they are actually DAOs (in the sense of “autonomous” organizations). On the other hand, these community-focused DAOs are often characterized by strong member engagement, perhaps because these are the types in which the mission comes through most strongly. It would be interesting to research further what constitutes these types of DAOs. We concluded that the value transfer and notary function of DAOs seem to correlate with each other. A financial focus often goes hand in hand with a more sophisticated governance process.

On a higher level, the mission types are also consistent with the purpose characteristic of Welpé & Ziegler: while collector, grants, and investment DAOs could be summarized under “investing or fund raising”, protocol and service DAOs deal with “product building and management”. Media and social DAOs, on the other hand, operate in the field of “community building and engagement” ([23], p.9). Just like with “product building and management”, in our case, protocol DAOs were the most frequent mission type.

7. CONCLUSIONS

In this paper we discussed the variety and fluidity of decentralized autonomous organizations (DAOs), which can take on various missions including investment, community-building, and incubating entrepreneurial ventures. DAOs aim to improve human coordination and have experienced significant growth in recent years, though they are still evolving and facing setbacks. The youthfulness of the phenomenon and the combination of automation and human involvement make them interesting but also prone to unexpected detours. While new tools and missions are emerging, time will tell whether DAOs can live up to their claims.

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