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The future of DAOs in finance

In need of legal status

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Contents

Abstract

Despite the crypto-market crash in the spring of 2022 and the collapse of FTX in November 2022, decentralised finance (DeFi) proponents are still predicting that DeFi may soon go mainstream. As well as the increasing involvement of regulated financial institutions in the DeFi area, the incipient presence of regulatory, supervisory and oversight frameworks may lead to more mainstream acceptance of DeFi. Many DeFi projects are structured in the form of a decentralised autonomous organisation (DAO), a virtual organisation built and run on code and blockchain technology. As this new DAO corporate structure has benefits appropriate for the era of digitalisation and decentralisation, the number of DAOs is growing. However, most countries around the globe do not yet have in place a specific legal regime for DAOs. Until now, DAOs have been operating outside of regulatory financial frameworks, even though they may perform functions that are similar to regulated financial institutions or market infrastructures. The legal characterisation of DAOs depends on national laws that may or may not apply, depending on how the DAO itself is actually set up and on court judgements. This paper introduces the DAO structure and how it relates to other methods of organisation in finance. The paper lists use cases and describes the benefits and drawbacks of the DAO structure, taking a closer look at (inter)national regulatory frameworks, guidelines and recommendations in order to discuss whether, how and to what extent DAOs might comply. A policy position on the desirability and conditions under which DAOs could bring efficient, safe and stable innovations to the financial sector depends on the specificities of the individual DAOs, the potential applicable regulatory frameworks and the continuously evolving technical developments, as well as (inter)national guidelines and recommendations. This paper proposes that the establishment of regulatory frameworks on crypto-assets and crypto-asset services, such as the EU Markets in Crypto-Assets (MiCA) Regulation[1], may force DAOs to rethink their legal status, governance and operational models.

Keywords: DAO, DeFi, crypto, international financial policy, financing policy

JEL classification: F38, F39, G23, G32, K22, L22, L31

[1] Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on markets in crypto-assets, (OJ L 150, 9.6.2023, p. 40).

1 Summary

Despite the crypto-market crash in the spring of 2022 and the collapse of FTX in November 2022, decentralised finance (DeFi) proponents are still predicting that DeFi may soon go mainstream. As well as the increasing involvement of regulated financial institutions in the DeFi area, another development may lead to more mainstream acceptance of DeFi, namely the incipient presence of regulatory, supervisory and oversight frameworks. With the growing number of DeFi projects, **the number of DAOs – virtual organisations built and run on code and blockchain technology – is also growing**. The new corporate structure of DAOs offers benefits appropriate for the era of digitalisation and decentralisation. However, as most countries around the globe do not yet have in place a specific legal regime for DAOs, how DAOs are to be understood and categorised is a matter for speculation. Because there is no general regulatory framework in this rapidly evolving environment, and a wide variety of DAOs, each DAO has to be understood and categorised individually. The legal characterisation of DAOs depends on national laws that may or may not apply, depending on how the DAO itself is set up. This requires an assessment of each DAO under the private and corporate law of the relevant legal system. A small number of legal systems have passed legislation specifically dedicated to DAOs. Others disregard the technology used and recognise aspects of DAOs according to existing laws, as a result of which they become subject to already established pieces of legislation. The legal recognition of a DAO in a given legal system may also be the result of a court judgement that can equate the features of an informal organisation with those of a formal one.

Most DAOs issue tokens, which may also be categorised as digital or crypto-assets, defined in the proposed MiCA Regulation as digital representations of a value or right that may be transferred and stored electronically, using distributed ledger technology or similar technology. They may also receive, hold in custody, clear and settle and transfer these crypto-assets. In the absence of a regulatory framework that recognises crypto-assets as a separate asset class and properly regulates the services around such assets, DAOs have been subject to few constraints in the way they organise themselves and run the development of their crypto-related projects. **The establishment of regulatory frameworks on crypto-assets and crypto-asset services**, such as MiCA, **may force DAOs to rethink their legal status, governance and operational models**. A DAO may well become subject to MiCA, which neither prescribes a specific form for legal persons, nor indicates how natural persons should organise themselves if they intend to provide crypto-asset services. As a result, when MiCA enters into force, DAOs may need to consider adapting certain aspects of their legal status, governance structure and/or operating models in order to satisfy any additional requirements that supervisors or regulators may prescribe, in order, for example, to be included in the ESMA (European Securities and Markets Authority) register of crypto-asset issuers and/or CASPs (crypto-asset service providers). When MiCA becomes applicable, **a DAO providing services within the remit of MiCA has to be authorised and take on legal personality if it intends to continue to provide crypto-asset services to European citizens.**

According to MiCA, crypto-asset services may be provided by undertakings that are not legal persons only if their legal status ensures a level of protection for third parties' interests equivalent to that afforded by legal persons and they are subject to equivalent prudential supervision appropriate for their legal form.

Leaving aside the specificities of individual DAOs, in general DAOs do not currently seem to have a comprehensive governance framework with clear and direct lines of responsibility and accountability for their functions and activities, similar to what is required by the CPMI IOSCO Principles for Financial Market Infrastructures (PFMIs) (BIS, 2012). However, in legal systems where they are established as legal entities, DAOs may, depending on their specificities, fulfil the FSB (Financial Stability Board) recommendation that coin issuance be governed and operated by one or more identifiable and responsible legal entities or individuals (governance bodies). Depending on the specificities of a DAO's voting system, it may or may not be deemed to fulfil the recommendation that the governance structure should allow for timely human intervention, as and when needed or appropriate.

A policy position on the desirability, acceptance of and conditions under which DAOs could bring efficient, safe and stable innovations to the financial sector (also in the area of payments) depends on the specificities of individual DAOs, the potential applicable regulatory frameworks and the continuously evolving technical developments, as well as (inter)national guidelines and recommendations. Further research, discussion and clarification of a variety of open questions is necessary, as suggested in the conclusion of this paper.

2 Introduction

Many current innovative projects in (and outside of) finance are structured in the form of DAOs. In short, these are **virtual organisations built and run on code and blockchain technology**. 2022 has even been called "the year of the DAO" (Hahn, 2022). The "New York Times" noted on 2 March 2022 that DAOs are one of the fastest-growing areas of the crypto-ecosystem. According to the World Economic Forum (June 2022), DAOs are the future way of doing business and are transforming corporate formation. Although the crypto-market crash in the spring of 2022 caused the world of decentralised finance (DeFi), which is founded on DAOs, to experience a period of recalibration, DeFi proponents and enthusiasts nevertheless predict that DeFi may soon go mainstream. Beyond the increasing involvement of regulated financial institutions in the DeFi area, another development that may lead to more mainstream acceptance of DeFi is the incipient presence of regulatory, supervisory and oversight frameworks.

The popularity of DAOs shows that the organisational form of a DAO has benefits for the individuals setting up the underlying project and for well-informed users. For others, however, such as regulators, overseers and insufficiently informed consumers, the DAO structure comes with challenges: lack of accountability, liability and legal personality. Jennings (2022) concludes that the benefits (Section 5 below) of Web3[2] across several sectors, including finance, art and music, are clear, and that these benefits will only become more pervasive as the expansion of Web3 accelerates. However, he proposes framing the trend towards decentralisation as a design challenge with three aspects (technical, economic and legal). He concludes that any failure to account for all three of these elements will lead us to a Web3 that falls short of the future that blockchain technology and crypto-currencies have made possible (Jennings, 2022).

The current trend towards further digitalisation and decentralisation seems clear. While it is difficult to find precise data, DAO treasuries may be worth as much as USD 10 billion (Redman, 2022), which could increase to USD 10 trillion in 10 years (Imran Khan, 2022). Other sources report that on 31 March 2023, the total assets of DAOs had reached a record USD 25.1 billion and that assets in DAO treasuries had more than doubled since the beginning of 2023.[3] According to another estimate, the total market capitalisation of DAOs in January 2022 was approximately USD 21 billion, with a total number of 4,227 DAOs (Soocial, 2023).[4] Analytics service DeepDAO reports that in 2021 the total value of DAO treasuries grew from USD 400 million to USD 16 billion, with the number of DAO participants increasing from

2 Web3 is the new, fashionable name for the decentralised World Wide Web, where participants of any network can read, write and "own" pieces of the products and services that they use every day.

3 Young, M. (2023), "DAO treasuries top $25 billion for the first time: DeepDAO".

4 Soocial (2023), "Decentralised Autonomous Organisations (DAO) Stats".

13,000 to 1.7 million (World Economic Forum, 2022).[5] According to Soocial, in January 2022 there were nearly 497,800 active users (voting and making proposals) out of 1.7 million token holders. According to DAO Times, the total market capitalisation of DAOs in January 2023 was approximately USD 8.8 billion, while the total number of DAOs was 10,752. By the end of 2022, the number of token holders had grown to 5.1 million, of which 1.6 million were active (voting and making proposals).[6] According to DeepDAO, on 13 June 2023 there were **a total of 12,745 DAOs with a total treasury of USD 18.5 billion, 6.8 million token holders and 2.4 million active voters and proposal makers**.[7]

	End of year 2021	End of year 2022	Growth
Number of DAOs	4,227	10,572	150%
Value	USD 16 billion	USD 8.8 billion	-45%
Token holders	1.7 million	5.1 million	200%
Active participants	0.5 million	1.6 million	220%

	End of year 2022	June 2023	Growth
Number of DAOs	10,572	12,745	20%
Value	USD 8.8 billion	USD 18.5 billion	110%
Token holders	5.1 million	6.8 million	33%
Active participants	1.6 million	2.4 million	50%

Source: own illustrations.

5 See See, G., Zhanassova, A. and Perumall, A. (2022), "Are 'decentralized autonomous organizations' the business structures of the future?", World Economic Forum, June. However, the WEF White Paper of June 2022, "Decentralized Autonomous Organizations: Beyond the Hype", mentions a number of 1.6 million participants.

6 Clement, S. (2023), "6 Interesting DAO Insights from 2022", *DAO Times*, January.

7 https://deepdao.io

While the DAO, the decentralised structure used for decentralised projects, comes with both positives and negatives, its future use and form will depend on whether or not this new creation can provide a solution for all the related aspects: not only technical, economic and legal, but also political, social and environmental (PESTEL analysis, 2016).

The focus of this paper is on DAOs in the financial sector, and more specifically the payments and securities sector. It acknowledges that the number of DAOs is also rising in the financial sector, that the new structure of DAOs differs from existing forms of financial organisations, and that until now DAOs have been operating outside of regulatory financial frameworks, although they may perform functions similar to those performed by regulated financial organisations. First, the paper will introduce the structure of DAOs in Section 3, also expanding on how they relate to other kinds of organisation in finance, such as crowdfunding. In Section 4, the paper will develop further understanding by providing use cases. In Section 5, the benefits and drawbacks of the DAO structure will be explained in more detail. Finally, in Section 6 the paper will take a closer look at the existing regulatory frameworks that have been introduced nationally and internationally worldwide, as well as international guidelines and recommendations, to ascertain whether, how and to what extent DAOs might comply. The paper concludes with some reflections on the organisational form of DAOs in the evolving financial sector and possible next steps towards appropriate regulation.

3 DAOs: what are they?

A DAO is a blockchain-based system that enables people to coordinate and govern themselves mediated by a set of self-executing rules deployed on a public blockchain, and whose governance is decentralised (i.e. independent from central control) (Hassan and De Filippi, 2021).[8] DAOs are referred to as the natural economic entities of Web3. They are internet-native businesses powered by blockchain technology and leaderless communities of people with a common goal, for example to make investment decisions. These DAOs can be described as alternative investment vehicles. DAOs can also be described as digital legal platforms. They are virtual organisations built and run on code and blockchain technology. While some argue that Bitcoin was effectively the first DAO (Buterin, 2014; Hsieh et al., 2018), the term is now understood as referring not to a blockchain network in and of itself, but rather to organisations deployed as smart contracts on top of an existing blockchain network (Hassan and De Filippi, 2021). In 2015, the Ethereum blockchain was introduced to develop the idea of running smart contracts on a decentralised ledger. At first, it was mainly used as a way to issue new tokens. However, it became clear that the blockchain could serve as a host for decentralised financial applications, based on the technology that runs smart contracts on secure distributed ledgers (Chiu, Kahn and Koeppl, 2022). Smart contracts enable individuals to engage directly in financial transactions without the use of third parties. This process is referred to as DeFi. It enables the elimination of third-party-run infrastructures (with consequences for costs, time and security) when lending, trading or paying. The DeFi infrastructure is built, maintained, run and "owned" by participants themselves, collectively. Despite what token holders may believe and despite what websites may promise, whether or not a DAO, the DeFi infrastructure itself or crypto-assets in general can truly be owned according to legal concepts is a matter for debate (Zilioli, 2020).[9] Even though they are currently not commonly used for financial transactions, DeFi applications for borrowing, lending and paying for any type of economic activity may in the future compete directly with centralised, regulated financial companies.

The US Department of the Treasury has described a DAO as a system of administration that operates according to a set of encoded and transparent rules or smart contracts (2022). It is an organisation that does not have a hierarchical decision-making process, for example through a board. Instead, decisions are made on the basis of members' votes and subsequently recorded in a programming code, known as a smart contract. The DAO operates on the basis of these smart contracts. The smart contract defines the rules of the organisation and holds the DAO's "treasury" (the funds held by the DAO to achieve its objectives). It can include, for example, rules on who may launch or vote on proposals and how the treasury is

8 While other definitions of DAOs exist, this particular definition clarifies the most important elements of a DAO: i) a way for people to organise themselves in a decentralised manner, ii) for any particular purpose, iii) while using blockchain technology and self-executing software code.

9 Zilioli, Ch. (2020), "Crypto-Assets: Legal Characterisation and Challenges under Private Law", *European Law Review*, Vol. 46, pp. 251-266.

disbursed. Smart contracts can only be changed through a vote by the DAO's members. Any matter may be put to the members' vote, including hiring employees, product development, strategy, investments and fundraising. However, the range of decisions that can be put to the vote depends on the DAO's mission. For example, most DAOs currently operate in the DeFi and investment sphere. These organisations might invest in non-fungible tokens (NFTs)[10]: members may therefore propose NFT collections to invest in and vote on that will ultimately receive investments (OliverWyman, 2022).

Although every DAO is built on the premise of distributed "ownership" and decision-making, various voting mechanisms exist in practice (further details are provided in Annex II), also resulting in various levels of decentralisation. As mentioned above, it is important to note that whether or not members actually own (a part of) a DAO in the traditional sense of legal ownership is debatable. This may depend on the specific DAO and the applicable national legal and regulatory regime. Regardless of the voting mechanism implemented, the idea behind DAOs is to distribute ownership and voting power transparently and efficiently. This framework facilitates collaboration and community engagement among all members of a DAO that share common goals and ideals. The question remains, however, whether DAOs are suitable for use in all sectors and use cases, for example the innovative financial payments sector.

As DAOs are also used to organise funding for various idealistic, cultural and economic activities, it is relevant to compare them with crowdfunding. Where DAOs differ from crowdfunding is their distinct organisational governance.[11] Furthermore, crowdfunding is regulated in Europe, while DAOs are not (further details on the comparison between DAOs and crowdfunding are provided in Annex III). DAOs operate through public and distributed decision-making, whereby any DAO member may typically put forward proposals for any type of corporate decision and vote on them. This facilitates collaboration and community engagement among all members of the DAO that share common goals and ideals. These goals are diverse and codified in DAOs' underlying smart contracts.[12] The funding of DAOs is often based on the sale of native tokens (Blockchain Council, 2022) and NFTs (Bellavitis, Fisch and Momtaz, 2022). These token sales enable ventures to raise substantial amounts of funding from crowds of investors; the funds may only be accessed with members' approval and smart contract operation. The tokens sold may carry voting rights, for which there are multiple voting mechanisms (described in Annex II). At the core of the innovative movement towards greater disintermediation is the ideal of fairer

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10 A unique digital identifier that cannot be copied, substituted, or subdivided, that is recorded in a blockchain, and that is used to certify authenticity and ownership (of a specific digital asset and specific rights relating to it).

11 In crowdfunding, entrepreneurs raise funding through the crowd, either through pure crowdfunding (e.g. Angel List) or through Initial Coin Offering (ICO) (e.g. Coinbase) platforms. In both cases, there is a controlling party (i.e. the company that raises funds) that decides on the company strategy. In some cases, the CEO or entrepreneur might try to engage with their community and, for example, survey investors or customers on certain aspects of the company such as product development. However, in crowd or ICO-funded ventures, the ultimate decision-making remains mostly centralised and top-down. In a DAO, the organisation fundraises through the issuance of tokens sold to a crowd of investors, as in an ICO, while the governance (in theory) is entirely public, automated and distributed.

12 For example, DAOs can set out to raise and distribute donations or can collect and invest funds in promising venture projects.

income sharing, as entrepreneurs and investors, sellers and buyers get to share the transaction surplus exclusively, without the need to pay for intermediation services due to the use of smart contract technology. Consider the example of the music sector. Through a DAO, musicians can cooperate and share decision-making amongst themselves, without the need for a third party. A music DAO enables every musician to be a shareholder, manager and service provider, all at the same time. However, questions remain. Do individuals in the group want to, and/or can they always, fulfil these democratic processes? This is known as the dilemma of lack of community participation. Is the construct of a DAO suitable for use in finance, and if so, when and with what requirements? Should investors be better protected? And where might specific risks and gaps exist in the organisation of a DAO that may need to be addressed? These questions will be discussed in Chapters 5 and 6.

4 Use cases

DAOs are used to accomplish various goals. There are also various types of DAOs (listed by Maduonuorah, 2022). **Protocol DAOs** are found behind all major decentralised finance (DeFi) protocols. These DAOs are used as an ownership and governance mechanism for lending platforms and yield optimisers. Examples of protocol DAOs are Uniswap, Aave and Maker.

Uniswap is the largest decentralised exchange on Ethereum. The platform launched its token, UNI, in November 2018. UNI holders vote or delegate votes that control the protocol's direction, fees and treasury. Aave is a major decentralised lending platform, which enables users to lend and borrow major assets. Decentralised lending platforms such as Aave are referred to as enabling trustless finance, as there is no need to trust an intermediary. However, in such decentralised platforms, users put their trust in the community, technology and code, rather than a regulated financial intermediary. Aave token holders govern platform decisions, such as the addition of new assets and the management of platform parameters, e.g. collateralisation ratios. Maker is one of the original DAOs in the DeFi ecosystem. As the governance mechanism for the Dai stablecoin (DAI), Maker utilises a DAO framework to vote on aspects such as adjusting the interest rate or the stability fee, or even triggering an emergency shutdown.

Investment DAOs are similar to traditional investment funds that operate with pooled capital. Rather than a single centralised party, investment DAO token holders can vote on the investment of the pool of funds. Examples of investment DAOs include MetaCartel Ventures, which is a DAO under the broader MetaCartel DAO. It is a for-profit DAO investing in nascent decentralised applications (DApps). The LAO (limited liability autonomous organisation) is structured as a member-directed venture capital fund in the United States. It is registered as a Delaware limited liability company (LLC) and carries out its functions via a DApp and smart contracts.

Grant DAOs are DAOs designed to fund and foster new ventures or projects, most often within the DeFi space. Uniswap Grants is a DAO that manages disbursement from Uniswap's UNI Community Treasury. This involves supporting the creation and growth of new projects around the Uniswap and DeFi ecosystem, by funding activities such as hackathons and protocol development. The Coffee Shop Support DAO is set up to provide financial support to local coffee shops, as determined by the NFT holding community. Gitcoin is an independent platform that funds developers and builders that create opensource applications; donors can browse projects listed on the platform and choose what they would like to fund. The DAO's governance token is GTC, which is used to manage its treasury, grants and disputes. Moloch is a share-based DAO, which has served as the foundational framework for several new DAOs, including MetaCartel. Moloch DAO focuses on Ethereum development funding through the use of grants, enabling anyone holding Moloch shares to submit a proposal.

The Trustchain Superapp (University of Delft, 2022) is a DAO that enables participants to fund and pay for music posted by artists, without the intermediation of a central party such as Spotify.

Collector DAOs pool funds to purchase collectable items such as NFTs, real-life artwork and music. Examples are PleasrDAO and Flamingo DAO.

Finally, there are **social DAOs**, where new members gain entry into a certain social circle by paying a membership fee to purchase a given number of the DAO's tokens. These social DAOs may take the form of any social circle, which often shares a common interest – possibly a group of knowledgeable investors, or a group of friends who hang out in a group chat or in real life, e.g. Cabin DAO. The DAO determines its own purpose. Other examples of social DAOs are Friends with Benefits and the Bored Ape Yacht Club.

Looking at payments in particular, many DeFi protocols are governed by some form of DAO. Some existing stablecoins are managed by DAOs, such as the DAI and FRAX stablecoins. **DAO use cases also involve payments and investments in the metaverse[13] and digitised investments (or speculation), for example in NFTs and crowdfunding.** These include micro-fund managers and entrepreneurs who are building companies to tap into the growing, yet highly volatile, financial Web3 crypto-asset ecosystems. In the current era of growing digitalisation, investors in Web3 are increasingly willing to invest in tokens over equity. Entrepreneurs are following the money and building themselves up as DAOs. Investors are setting up funds as DAOs, with notable examples being Orange DAO, VC3DAO and BessemerDAO (Forbes, 2022). Entrepreneurs are using DAOs to fundraise globally and in some cases promise to hand over the ownership of their enterprise to their communities. DAOs promise new forms of organisational structures and collaboration in the digital and global space. As significant digital value is created through (non-fungible) tokens in the metaverse, DAOs could be the native entity for value creation in cyberspace. Many blockchain protocols are built as global collaborations across borders. DAOs claim to enable decentralised worldwide collaborations by coding governance rules without the need to trust centralised intermediaries. They are run by members who normally hold tokens (crypto-assets) that provide decision-making rights and/or economic rights in the organisation. DAOs allow members from anywhere in the world to pool capital and code rules for how they will allocate the capital. Governance of DAOs is automated by code and decentralised, which – at least in theory – means that no one person can change the rules. The actual level of decentralised governance is debated. **Not all DAOs that exist today have an absolute form of decentralised governance, but rather varying levels of central power (DNB & AFM, 2021).**

[13] The metaverse is considered the next evolution of the internet, on which it builds. In the metaverse, users traverse a virtual world that mimics aspects of the physical world, using such technologies as virtual reality (VR), augmented reality (AR), artificial intelligence (AI), social media and digital currency. While the internet is something that people "browse", to a degree people can "live" in the metaverse.

5 Future potential, benefits and drawbacks of DAOs

DAO proponents argue that DAOs offer many benefits compared with traditional corporate structures, including the following.

Lower barriers to entry, leading to higher levels of financial inclusion, as people around the world with access to the internet are able to participate.

Voting and implementing decisions are more efficient and less costly. DAO members make collective decisions themselves on any action or change to the DAO, so there is no need for a central authority or an expensive hierarchical structure. Furthermore, as smart contracts can take care of vote delegation, there is no need for expensive and timely paper mailings or secure e-proxy voting schemes.

Speed, due to rapid pooling and deployment of capital, as these functions are automated by smart contracts and are automatically implemented after voting thresholds are met.

Flexibility, the simple, fast voting process makes it easy to amend the rules of governance of the DAO, eliminating the need to hold a (physical) meeting to vote and draft amendments to the corporate charters, bylaws or statutory laws governing the organisation.

Pure democracy and disintermediation, because the power over the organisation is spread throughout the group rather than concentrated in a small, elite subset. DAOs are said to represent the natural evolution of crowd-based decision-making platforms.

Full transparency, all the DAO's actions are conducted and automatically recorded on the blockchain and are publicly verifiable.

Innovation through cooperation, rather than competition. DAOs allow a multitude of members to contribute toward innovative goals and projects, sharing knowledge, resources, and ideas. Cooperating rather than competing with other firms allows partners to access complementary resources that can contribute to the development of innovation (De Faria, Lima and Santos, 2010).

Despite their purported benefits, DAOs also come with drawbacks: for example, the requirement to vote on all changes to the DAO, even to fix an omission or bug. During the time it takes to organise the vote, hackers may take advantage. Other drawbacks include the following.

Rigidity of execution. DeFi applications may be too rigid in the way they implement smart contracts. Intermediaries are able to adjust contract execution for

contingencies. Future technological advances may make it possible to make smart contracts more complete and automate any renegotiation of such contracts.

An excessive number of proposals. Members may put forward any proposal for a vote: consequently, there may be so many that voting members lose interest and stop voting.

No legal relationship[14]. Rather than issuing traditional equity, DAOs issue tokens. Token holders expect governance rights and/or economic returns from tokens. However, there is often no actual legal relationship between token holders and DAOs. This exacerbates the risk of misselling, as the expectations of uninformed or misinformed buyers may be unrealistic and these investments may not be appropriate for their financial circumstances. As there is no legal relationship, DAO communities also run the risk of dealing with participants that take on false identities.

Lack of clarity over the legal status of a DAO, resulting in uncertainty and concern. DAOs often have no formal corporate structures and no explicit terms for liability protection, and provide no clear distinction between the various roles of the participants.

Uncertain accountability. Uncertainty over the individual liability of DAO members.

Tax liability. In most countries, DAOs cannot file taxes or benefit from tax refunds. It is not yet clear whether DAOs will be taxed as distinct corporations or as pass-through vehicles. This means that membership of DAOs could entail a direct tax liability for individuals investing in them.

Data gaps. Because DAOs are still a very recent phenomenon, data availability is very limited.

Overall, **the most important positives of the DAO structure for the people that use them are financial inclusion, self-sovereignty and self-fulfilment in the quest for pure democratic processes. Disintermediation, theoretically reducing costs in the payment chain, and direct payment for any ideal or economic activity from the payer to the payee**, are also regarded as important benefits. At the same time, many people that use DAOs are attracted for speculative reasons and the fact that these organisations are able to operate outside the financial regulatory framework and supervision.

The biggest drawbacks are challenges related to voting, which can be compared with the challenge of democracy: in particular, the difficulty of getting shareholders to turn up and vote at shareholders' meetings, and the complexity that comes with **having no legal personality and no clear accountability and liability.**

[14] This drawback depends on how the tokens are classified. Unlike regulators in other legal systems, the US Securities and Exchange Commission holds the view that tokens are securities, constituting the presence of a legal relationship between the issuer and the securities holder (SEC, 2022).

6 Regulatory frameworks

In an attempt to address the drawbacks and uncertainty relating to DAOs and their legal status in particular, **several legal systems have already introduced laws. Others are still waiting to see how the market develops** and whether further action is necessary. **The result is legal fragmentation**. In January 2023, the Finnish Minister of Transport and Communications, Timo Harakka, called for a European law to recognise DAOs (Schickler, 2023).[15] Regulators worldwide are struggling more generally with how to classify and regulate decentralised initiatives, such as financial applications in which there is no central lender. Harakka argues that it is time to at least start thinking about a philosophical approach to the issue, while for some policymakers it may be too early to set rules for decentralised finance, and the topic is largely ignored in the EU's landmark MiCA Regulation.

This section looks at how DAOs relate to regulatory frameworks. More details on national regulatory frameworks are provided in Annex [I].

The existing international regulatory frameworks were not written with the relatively new phenomenon of DAOs in mind. This section therefore attempts to analyse how DAOs could fit into such frameworks and the extent to which they do or do not comply with them, also with a view to providing possibly helpful insights for a potential future (EU) regulation catering for DAOs.

To date, **most new national regulatory regimes have included DAOs within existing laws and concepts**. In a 2017 press release, the US Securities and Exchange Commission (SEC) clarified that DAO tokens were to be treated as securities in the United States and were therefore covered by securities regulation. **Other legal systems have introduced tailormade regulatory frameworks to clarify the legal status of DAOs.** Probably the most notable attempt in Europe to date has been made by Malta. Under the Maltese blockchain strategy, the Maltese Parliament passed three bills that entered into force in 2018, creating a completely new legal framework to complement earlier initiatives in virtual currencies. The Innovative Technology Arrangements and Services Act (ITAS Act) regulates, inter alia, the certification of "technology arrangements". This regulation places DAOs within the scope of a new legal entity broadly designated as "technology arrangements" and under the scrutiny of a new regulatory body, the Digital Innovation Authority. Despite the establishment of this framework in Malta, DAO-related activities remain limited (Malta Digital Innovation Agency, 2022).

Although legal recognition of DAOs continues to be very limited worldwide, some US states (Vermont, Colorado, Wyoming and Tennessee) have also introduced laws specifically targeting them, as have the Cayman Islands, Switzerland and Singapore. A brief summary of these regulations and others is provided in Annex [I].

[15] Schickler, J. (2023), "Finnish minister calls for EU law to recognize DAOs", January.

In the absence of a clear regulatory framework for DAOs, the market continues to grow and develop. Some supervisory and regulatory authorities are therefore taking action to fulfil their mandate to keep the financial markets safe, stable and working efficiently.

In the United States, the Commodity Futures Trading Commission (CFTC) sued Ooki DAO (2022), establishing that liability for engaging in activities that only registered futures commission merchants can perform and failing to adopt a customer identification programme is attributable to the software developers and consumer members of these DAOs.

In March 2023, a California court ruled that the bZx protocol and its token-holding community members were liable for losses resulting from an exploit that drained their DAO's treasury. Members of Ooki DAO were notified of the lawsuit when the CFTC posted the complaint and other documents to an online discussion forum meant for DAO members to discuss governance issues. The documents were simultaneously submitted through a help chat box on the DAO's website. The CFTC argues that Ooki DAO meets the federal definition of an "unincorporated association" because it is (i) a voluntary group of persons, (ii) without a charter, (iii) formed by mutual consent, (iv) for the purpose of promoting a common objective. Therefore, it argues, since members of an unincorporated association can be held personally liable for the actions of an association, certain token holders of the Ooki DAO can be held personally liable for the actions of the DAO. The token holders include "those authorized to work on behalf of the Ooki DAO [including its] members, officers, employees, and agents" (CFTC, September 2022).[16] In January 2023, the CFTC asked a federal judge to rule that the DAO had violated federal commodities laws after it failed to respond to the ongoing lawsuit. On 8 June 2023, US District Judge W.H. Orrick ruled that Ooki DAO was operating an illegal trading platform and had acted unlawfully as an unregistered futures commission merchant, granting the CFTC a default judgement. He ordered the organisation to pay a fine of USD 643,542, permanently cease its operations and shut down its website.[17]

In the United Kingdom, in the summer of 2022, the Law Commission announced a 15-month period of research on DAOs. On 16 November 2022, the Law Commission published a call for evidence on DAOs, to help it produce a scoping study to consider their current treatment under the laws of England and Wales and identify options for their future treatment that would clarify their status and facilitate uptake.[18] On 1 February 2023, the UK Treasury launched a consultation and call for evidence on a series of proposals for the future financial services regulatory regime for crypto-assets. The proposals mark the next stage of the Government's project to regulate crypto-assets in the United Kingdom, including rules to provide a balance between promoting innovation and protecting consumers. The consultation builds on previous

16 CFTC (2022), "CFTC Order Finds, and Complaint Alleges, Ooki DAO is Liable as an Unincorporated Association", Release Number 8590-22, Commodity Futures Trading Commission, September.

17 CFTC (2023), "Statement of CFTC Division of Enforcement Director Ian McGinley on the Ooki DAO Litigation Victory", Release Number 8715-23, Commodity Futures Trading Commission, June. Default judgement: enfookidaojudgment

18 Ministry of Justice Law Commission (2022), "Decentralised Autonomous Organisations (DAOs) – Law Commission Call for Evidence", November.

publications, including the April 2022 plan[19] to make the United Kingdom a global hub for crypto-asset technology. The consultation report states that establishing clarity in the legal structure of DAOs will play an important role in determining how regulation could be applied to these structures (DAOs).[20]

EU **MiCA** Regulation

The European Union was the first region to establish a regulatory package for crypto-assets, in the form of the MiCA Regulation, although DeFi and DAOs as such are not within MiCA's remit. Earlier text proposals by the European Parliament contained several references to DAOs. However, since the political accord (October 2022), **the text of MiCA no longer contains specific references to DAOs**. Recital 22 MiCA[21] specifically states that where "crypto-asset services as defined in this Regulation are provided in a fully decentralised manner without any intermediary, they do not fall within the scope of this Regulation". This means that fully decentralised DAOs are not currently intended to be within MiCA's remit, although the actions of their natural person members may well have legal consequences. Despite this, it could be argued that when a DAO, perhaps not fully decentralised, issues tokens that are classified as crypto-assets and provides services that are within MiCA's scope, the DAO has to fulfil MiCA's requirements. Following that line of reasoning, **when MiCA becomes applicable at the end of 2024, DAOs will have to adopt legal personality if they intend to continue to provide crypto-services to European citizens, or have a legal status that ensures a level of protection for third-party interests equivalent to that afforded by legal persons and subject to equivalent prudential supervision appropriate to their legal form.** DAOs may, for example, issue crypto-assets, but these may only be offered to European citizens by a registered CASP. **MiCA contains no specific requirements on the form of legal personality that the DAO should adopt.** This entails a risk of further regulatory fragmentation.

DeFi is only mentioned in Article 122.2 and Article 122b MiCA. Within 18 months of MiCA's application, the Commission is to write a report that will also assess the development of decentralised finance in the crypto-asset markets and the adequacy of the regulatory treatment of decentralised crypto-asset systems. Article 122b 2(a) further specifies that the report on the latest developments in crypto-assets must contain at least the following: an assessment of the development of decentralised finance in the crypto-asset markets and of the adequacy of the regulatory treatment

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19 Proposed in a keynote speech at the Innovate Finance Global Summit on 4 April 2022 by John Glen, MP, former Minister of State (Economic Secretary) to the Treasury in the United Kingdom.

20 HM Treasury (2023), "Future financial services regulatory regime for cryptoassets", February.

21 Recital 22, "This Regulation should apply to natural and legal persons and certain other undertakings and to the crypto-asset services and activities performed, provided or controlled, directly or indirectly, by them, including when part of such activities or services is performed in a decentralised manner. Where crypto-asset services are provided in a fully decentralised manner without any intermediary, they should not fall within the scope of this Regulation. This Regulation covers the rights and obligations of issuers of crypto-assets, offerors, persons seeking admission to trading of crypto-assets and crypto-asset service providers. Where crypto-assets have no identifiable issuer, they should not fall within the scope of Title II, III or IV of this Regulation. Crypto-asset service providers providing services in respect of such crypto-assets should, however, be covered by this Regulation".

of decentralised crypto-asset systems without an issuer or crypto-asset service provider, including an assessment of the necessity and feasibility of regulating decentralised finance.

In this report on developments in DeFi, or perhaps even in a review of MiCA, the Commission may clarify the position of DAOs under this European Regulation.

In addition to MiCA, as part of a bigger programme to research DeFi, on 10 October 2022 the European Commission put out a call to study the "embedded supervision" of DeFi protocols on the Ethereum blockchain, signalling that more EU regulation is on the horizon (Napolitano, 2022). In addition, the European Commission published a report entitled "Decentralized Finance: information frictions and public policies: Approaching the regulation and supervision of decentralized finance" on 1 November 2022 (Roukny, 2022).

Principles for financial market infrastructures (BIS, 2012)

The PFMI[22] are a set of 24 key standards that the international community considers essential for strengthening and preserving financial stability. The PFMI are designed to help ensure the safety, efficiency and resilience of the infrastructures supporting global financial markets: their full, timely and consistent implementation is therefore fundamental. The PFMI were written well before the creation of DAOs and so do not take them into consideration. However, as DAOs in DeFi may replicate traditional financial services within the crypto-asset ecosystem (credit services, investment services, storage of crypto-assets through platform interfaces and blockchain bridges), they provide some services that are akin to the functions provided by financial market infrastructures, such as custody or clearing and settlement activities (Born, Gschossmann, Hodbod, Lambert and Pellicani, 2022).[23] It could therefore be argued that some DAOs may be classified as innovative, though not yet systemic, financial market infrastructures, so it is interesting to consider this new creation with respect to the PFMI. Since in many countries there is no legal regulatory framework specifically designed for DAOs, it is generally true that **DAOs do not seem to comply with the first three principles: i.e. on a legal,[24] governance[25] or risk management[26] basis. Furthermore, DAOs do not readily comply with**

22 BIS (2012), "Principles for Financial Market Infrastructures (PFMI)", Bank for International Settlements, Basel.

23 Born, A., Gschossmann, I., Hodbod, A., Lambert, C. and Pellicani, A. (2022), "Decentralised finance – a new unregulated non-bank system?", *Macroprudential Bulletin*, ECB, Frankfurt am Main.

24 "Principle 1: Legal basis. An FMI should have a well-founded, clear, transparent, and enforceable legal basis for each material aspect of its activities in all relevant jurisdictions."

25 "Principle 2: Governance. An FMI should have governance arrangements that are clear and transparent, promote the safety and efficiency of the FMI, and support the stability of the broader financial system, other relevant public interest considerations, and the objectives of relevant stakeholders."

26 "Principle 3: Framework for the comprehensive management of risks. An FMI should have a sound risk-management framework for comprehensively managing legal, credit, liquidity, operational, and other risks."

Principles 15 to 17[27] on general business risk management, custody and investment risks and operational risk.

Application of the principles for financial market infrastructures to stablecoin arrangements (BIS, 2022)

In July 2022, the Committee on Payments and Market Infrastructures and the International Organization of Securities Commissions (CPMI/IOSCO) published a report to provide guidance on the application of the PFMIs to stablecoin arrangements (SAs) that are considered systemically important financial market infrastructures (FMIs), including the entities integral to such arrangements. Although systemically important DAOs do not yet exist, and although, without legal personality, it is debatable whether DAOs can be classified as FMIs at all, this report is nevertheless relevant because, like SAs, DAOs provide a transfer function (transfer of crypto-assets between users), which is considered an FMI function for the purposes of applying the PFMIs. Furthermore, like SAs, DAOs may present some notable and novel features compared with existing FMIs. These novel features relate to (i) the potential use of settlement assets that are neither central bank money nor commercial bank money and carry additional financial risk; (ii) the interdependencies between multiple SA functions; (iii) the degree of decentralisation of operations and/or governance; and (iv) the potentially large-scale deployment of emerging technologies, such as distributed ledger technology (DLT).

According to this CPMI/IOSCO guidance, when seeking to observe Principle 2 (appropriate governance arrangements) a systemically important SA should consider whether:

the ownership structure and operation allow for clear and direct lines of responsibility and accountability: for example, it is owned and operated by one or more identifiable and responsible legal entities that are ultimately controlled by natural persons;

the governance allows for timely human intervention, as and when needed on a continuous basis;

the ownership structure and operation allow the SA to observe Principle 2 and the other relevant principles of the PFMIs, irrespective of the governance arrangements of other interdependent functions.

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27 "Principle 15: General business risk. An FMI should identify, monitor, and manage its general business risk and hold sufficient liquid net assets funded by equity to cover potential general business losses so that it can continue operations and services as a going concern if those losses materialise. Further, liquid net assets should at all times be sufficient to ensure a recovery or orderly wind-down of critical operations and services. Principle 16: Custody and investment risks. An FMI should safeguard its own and its participants' assets and minimise the risk of loss on and delay in access to these assets. An FMI's investments should be in instruments with minimal credit, market, and liquidity risks. Principle 17: Operational risk. An FMI should identify the plausible sources of operational risk, both internal and external, and mitigate their impact through the use of appropriate systems, policies, procedures, and controls. Systems should be designed to ensure a high degree of security and operational reliability and should have adequate, scalable capacity. Business continuity management should aim for timely recovery of operations and fulfilment of the FMI's obligations, including in the event of a wide-scale or major disruption."

To fulfil Principle 3 (comprehensive risk management), a systemically important SA must develop appropriate risk management frameworks and tools to address these risks. In particular, it should identify and implement appropriate mitigation actions, taking an integrated and comprehensive view of its risks.

To comply with Principle 8 (settlement finality), a systemically important SA is required to:

clearly define the point at which the transfer of a stablecoin through the operational method used becomes irrevocable and unconditional;

ensure that there is a clear legal basis that acknowledges and supports the finality of a transfer;

have robust mechanism(s) for preventing any misalignment between the state of the ledger and legal finality and ensure that the legal finality of a transfer, once it has occurred, is maintained regardless of competing state(s) of the ledger.

Finally, with regard to Principle 9 (money settlements), a systemically important SA has to determine whether the credit and liquidity risks of the coin that it uses for money settlements are minimised and strictly controlled and whether the coin is an acceptable alternative to the use of central bank money.

Whether DAOs fulfil any of these principles depends on the specificities of the individual DAO. Generally speaking, **DAOs as currently constructed do not seem able to comply with any of the PFMIs applied to SAs.**

Proposed framework for the international regulation of crypto-asset activities (FSB, 2022)

In October 2022, the FSB proposed a framework for the international regulation of crypto-asset activities. The key components of this framework are proposals for:

recommendations to promote the consistency and comprehensiveness of regulatory, supervisory and oversight approaches to crypto-assets and crypto-asset markets and to strengthen international cooperation and coordination and information sharing; and

oversight of “global stablecoin” arrangements.

The proposed recommendations were issued for public consultation until 15 December 2022, with 39 responses received and published. The FSB expects to publish the final reports in July 2023.[28]

Concerning the crypto-related recommendations, the FSB proposes that authorities should apply effective regulation, supervision, and oversight to crypto-asset activities and markets – including crypto-asset issuers and service providers – proportionate

[28] https://www.fsb.org/2023/01/public-responses-to-fsbs-proposed-framework-for-international-regulation-of-crypto-asset-activities/.

to their risks, size, complexity and systemic importance, in line with the principle of "same activity, same risk, same regulation" (Recommendation 2). Furthermore, authorities should require that crypto-asset issuers and service providers partaking in activities or markets that (potentially) pose risks to financial stability have in place and disclose a comprehensive governance framework – proportionate to their risks, size, complexity and systemic importance – with clear and direct lines of responsibility and accountability for the functions and activities they are conducting (Recommendation 4).

The FSB acknowledges the fact that there is a wide variety of DAOs, which makes regulation difficult. In order to safeguard financial stability, the FSB calls on authorities to look at each DAO individually to determine who is to be held accountable for what. The FSB states that "*the extensive use of distributed and decentralised technology in the operations and/or governance of crypto-asset activities has contributed to opaqueness and a lack of accountability. Identifying the entities or natural persons that should be held accountable for good governance and regulatory compliance may be difficult. Where crypto-asset activities are provided within the "Decentralised Finance" (DeFi) ecosystem by DeFi protocols, there exist a variety of governance structures, some of which may obfuscate the identification of a governance body or impede the application of regulation. In some other cases, there may be multiple individuals/entities responsible for the operation of an activity that have not adequately disclosed their roles. Such complex and opaque organisational and governance structures pose challenges for regulators. Regulators and supervisors need to look past the labels and marketing around a product or service, and consider the facts and circumstances of each case to establish ways to identify who exercises effective control on the protocol or provides access to the protocol, and to make them accountable under existing or future regulation.*

Many crypto-asset issuers and service providers do not have a transparent governance structure with clear accountability. In some cases, governance of a crypto-asset issuer or service provider is dispersed across multiple actors, who each have control or influence only over certain aspects of the relevant operations. A lack of strong governance, which can occur when crypto-asset issuers and service providers are unregulated or operating in non-compliance with applicable regulation, could create or exacerbate financial stability concerns".

Regarding the Review of the FSB High-level Recommendations for the Regulation, Supervision and Oversight of Global Stablecoin Arrangements (GSC), the FSB proposes that authorities should require that GSC arrangements "*have in place a comprehensive governance framework with clear and direct lines of responsibility and accountability for all functions and activities within the GSC arrangement. Authorities should require that the ownership structure, governance and operation do not impede the effective application of relevant regulations and standards, consistent with the FSB High-level Recommendations. In particular, authorities should require that GSC issuance be governed and operated by one or more identifiable and responsible legal entities or individuals ('governance body'). The governance structure should allow for timely human intervention, as and when needed or*

appropriate[29]" (Recommendation 4). Currently, without further clear regulation, it is questionable whether DAOs can fulfil this requirement. Depending on the specificities of the voting system of a DAO, it may or may not be deemed to fulfil the recommendation that the governance structure should allow for timely human intervention, as and when needed or appropriate.

On 16 February 2023, the FSB published another report, "The Financial Stability Risks of Finance", which also refers to DAOs when discussing the governance structure of DeFi protocols (paragraph 1.2.3., pp. 11 and 12). Here, the FSB hints at an answer to the question of whether the governance structure of a DAO fulfils Recommendation 4: depending on the individual DAO and depending on the voting system, in general, **without a delegated decision-making authority, decisions may take much longer to be approved, making the process inefficient and implying that necessary software upgrades may not be addressed in a timely manner.**[30] However, the report also acknowledges (paragraph 2.1.1., p. 17) that in reality, the holding of voting powers across major DAOs and DeFi protocols is highly concentrated, implying that in practice only a few controlling actors can propose, pass or implement initiatives.

Overall, the speed at which computer technology evolves outpaces the rate at which legislation and regulatory frameworks can be codified. The technology behind blockchains is still relatively new, as is the corporate structure of the DAO, which is used by a growing number of people to organise economic activity on an ever-evolving internet leading to Web3, and/or the metaverse or an entirely different version of the internet. Some countries try to fit these new developments into existing laws. In the United States, crypto-assets have been classified as securities: accordingly, they fall within the existing regulatory framework. In the United Kingdom, crypto-assets are classified as financial instruments, with the same effect. Other legal systems have developed new laws to try to cater specifically for these new concepts. Most of these newly established laws create some form of legal personality, enabling DAOs to participate and make transactions in the economy and pay taxes, and address the complexity around anonymity. However, this does not solve the problem of the lack or limitation of liability and accountability, as liability is often either limited or excluded for individuals registering a DAO. The question of who is responsible and liable for the (lack of) actions of DAOs is still being hotly debated. The US courts attribute culpability to all software developers and participants in a DAO. Whether or not software developers in DAOs have an implicit fiduciary duty because their software coding affects the assets and interests of consumers is another subject of debate. In this regard, it may be helpful to focus on the activities performed by a party, rather than on what it call itself. If developers formed a corporation to launch and operate public blockchains, rather than having separate foundations to pay developers, no one would question the fact that the

[29] It is interesting to note that this wording, in referring to governance needing to allow for timely human intervention, as and when needed on a continuous basis, differs from that of "Application of the principles for financial market infrastructures to stablecoin arrangements".

[30] FSB (2023), "The Financial Stability Risks of Decentralised Finance", Financial Stability Board, February.

officers, directors and controlling shareholders of that corporation had fiduciary duties in their leadership roles and that the corporation should be accountable for any harm that it caused. The functions that proponents of DAOs expect them to perform are critical infrastructural functions in our societies and monetary system. As coding becomes infrastructure building and maintenance, the individuals responsible for building and maintaining code and those responsible for making decisions about these core infrastructures must take what they are doing seriously and accept the consequences, assuming liability and accountability for their actions and participation (Haque, 2019).

International laws, regulations and guidelines are moving towards requiring DAOs that offer crypto-services and/or issue tokens to have a governance body, which can be defined as one or more identifiable and responsible legal entities or individuals.

7 Conclusion and next steps

Technology has outpaced regulation in relation to DAOs. The current approach in many legal systems is to try to fit DAOs into a company registration framework that was built for a pen and paper era. Because the number of DAOs is growing, including in the financial sector, there is an urgent need to build a suitable regulatory framework around this new entity enabled by new technology, which requires cooperation between technologists, regulators, supervisors and entrepreneurs. To address the drawbacks of the DAO as an organisational form, as well as regulatory/legal uncertainty, DAOs have to adopt a legal form to contract with stakeholders and perform functions similar to those performed by regulated financial organisations while the possibility of limiting personal liability remains in place. Placing a DAO into a corporate structure does not necessarily change its decentralised purpose. The DAO's community members are still free to make collective decisions (to purchase art or donate and direct assets towards a particular project). The DAO can also keep its bottom-up, distributed governance model. For DAOs seeking to limit the liability of their members and developers and for DAOs that want to interact with parties off-chain, some form of legal structure is necessary.

Further research and discussion is necessary on a number of questions. How do the functions performed by DAOs compare with those of centralised, regulated financial organisations and infrastructures? According to the principle of same activities, same risks, same rules/regulatory outcome, the question of whether DAOs should be regulated is a valid one. Another question concerns the ownership of DAOs and digital assets in general. Digital assets, like digital company structures, are hard to fit into the legal ownership framework written for an analogue era. This issue is still being debated, and there is legal fragmentation. This is an important matter to consider, particularly for global constructions such as DAOs.

With DAOs taking on new legal structures, several supervisors are looking into the possibility of real-time supervision, potentially on the blockchain. The European Commission has put out a call to study "Embedded supervision of decentralised finance (DeFi)" protocols. The project will explore the prospect of automated data-gathering directly from the Ethereum blockchain and test the technological capabilities for supervisory monitoring of real-time DeFi activity. The UK Government has asked the UK Law Commission to research DAOs for a period of 15 months and a call for evidence has been published. The outcome of this research may be of great interest and benefit to other authorities around the globe.

Until DAOs are adequately regulated globally, in the sense that the abovementioned challenges have been solved so that they do not and will not in future pose a serious threat to financial stability, payments and securities systems operate smoothly and consumers are properly protected, the place for DAOs in the financial sector of the future will necessarily remain limited. Users should be made aware of the risks they face. Regulators can clarify how DAOs relate to current regulation and under what

conditions they could potentially be classified as compliant with established standards, guidelines and recommendations.

Annex I Legal frameworks for DAOs

Cayman Foundation DAO

Cayman Foundations are not required to have members. The Cayman Companies Act governs Cayman Foundations, unless they are excluded or inconsistent. The key features of a Cayman Foundation DAO are as follows.

- Purpose: may be formed for any lawful purpose, including a charitable one.
- Separate legal personality: defined as a legal person, which means the DAO may be a contracting entity and may:
  - limit the liabilities of its members (if it has members);
  - interact and form contracts with third parties;
  - file and pay taxes;
  - open bank accounts and make cash transactions;
  - hold and protect off-chain assets;
  - protect intellectual property;
  - serve as a vehicle for grants;
  - act as a parent or holding entity with subsidiaries to carry out functions for a project.
- Flexibility: governing rules, structure and roles may be adapted. The constitution may be supplemented with bylaws that are not filed with the Companies Register, affording the DAO the privacy and flexibility to set its own rules on structure and management. The substantive rules about how community members will govern the DAO are typically laid down in bylaws, which may also restrict the directors' powers, in keeping with the DAO's democratic governance model.

The usual roles in a Cayman Foundation are as follows.

- Founder: the person who established the structure through a contribution of assets. The governing documents of the Foundation specify what (if any) powers the Founder retains. The Founder may reserve the power to appoint the directors or amend the governing documents, but the Founder may also have no ongoing role in the foundation. Since DAOs utilise a bottom-up governance structure, the Founder would not normally retain any powers in the Cayman Foundation.

- Director(s): the Foundation is managed by a board of directors, with the same powers as in any other company, though they may be restricted to align with the DAO's specific objectives.

- Members/shareholders: like any company, the Foundation must initially be incorporated with one or more members. One of the key features of a Cayman Foundation is that it can cease to have members at any time, without affecting the Foundation's existence, capacity or powers. A Cayman Foundation DAO may therefore exist as an orphan entity without any members or shareholders. An ownerless Cayman Foundation DAO fits with the hierarchy-less DAO and its community.

- Beneficiaries: Cayman Foundations may choose to have beneficiaries. Unless otherwise specified, beneficiaries will not have any powers, rights or standing. Beneficiaries may be specified persons or a class of persons, for example token holders or certain community members, whom the Cayman Foundation DAO may be structured to reward. As beneficiaries of the Cayman Foundation DAO, token holders would not have any personal liability for the foundation's debts or financial losses.

- Supervisor(s): if a Cayman Foundation ceases to have members, it must have one or more "supervisors", who may also be directors. Supervisors enforce the rules of the Cayman Foundation and typically have the right to access its files, books and accounts. A supervisor has no ownership or economic entitlement in a Cayman Foundation.

The Caymans' Virtual Asset Service Providers Act (VASP Act) offers a regulatory framework for VASPs. "Virtual assets" are defined as digital representations of value that can be traded or transferred and used for payment or investment purposes. A DAO that offers tokens may constitute a VASP. The Act requires entities engaging in virtual asset services to obtain a licence and/or register with the Cayman Islands Monetary Authority.

Singapore company DAO

In Singapore the most common legal entity is a company limited by shares. It is created by registering with the country's Accounting and Corporate Regulatory Authority (ACRA). The share transfer process is not instantaneous, which complicates things for a DAO, where a transfer of tokens on a public ledger is immediate – a member's register does not update in real time. Also, members of a Singapore company are not anonymous; anyone can purchase a business profile, which would identify them, on the ACRA platform. There are ways to work around these limitations. First, a DAO may organise itself as a Singapore company limited by guarantee. Unlike a company limited by shares, a company limited by guarantee is more suitable for DAOs with a non-profit element, such as collector DAOs or social DAOs. A company limited by guarantee is prohibited from paying any dividends or

profits to its members. Next, a Singapore company DAO may establish an advisory board represented by token holders. According to this structure, these token holders would serve as the pseudo-decision-makers of the company by initiating and voting on proposals. Then, a project team or other party, acting as members of the company, would execute the DAO's decisions. These members would appoint directors, who owe a fiduciary duty to the company to act in its best interests, and they would, in turn, implement the will of the advisory board. The constitution of the company would include the establishment of the advisory board, specifying that the members and directors are obligated to execute the wishes of the DAO advisory board.

Vermont blockchain-based LLC

In 2018, Vermont enacted a law establishing blockchain-based limited liability companies (BBLLCs). The law does not explicitly mention DAOs, but generally applies to companies that "utilise blockchain technology for a material portion of [their] business activities." To qualify for the BBLLC designation and its limited liability protection, a company's operating agreement must include (1) a description of its mission or purpose; (2) the level of its decentralisation; (3) an indication of whether the blockchain is public or private; (4) its voting and governance procedures; (5) its security breach mitigation protocols; (6) its membership acquisition process; and (7) an account of the rights and obligations of the participants.

Wyoming DAO LLC

In 2021 the state of Wyoming passed a law – subsequently amended in March 2022 – that allows a DAO to incorporate itself as an LLC and defines a DAO as "a limited liability company whose articles of organisation contain a statement that the company is a decentralised autonomous organisation." This would give DAOs the option of acting as traditional undertakings in conducting business transactions (e.g. hiring employees), clarifying accountability and providing DAOs with legitimacy. The traditional legal protections and personality afforded to a Wyoming LLC are extended to algorithmic and member-managed DAOs incorporated under the law. However, sceptics argue that both legal forms undermine DAOs' full potential. In the member-managed case, several provisions (e.g. the necessity to maintain a registered agent in Wyoming), would reintroduce human, centralised control. In the algorithmically managed case, Wyoming law stipulates that smart contracts may be amended or updated at any time, going against the immutability of public records on the blockchain and potentially requiring consensus mechanisms that would either be impractically decentralised or centralised (JD Supra, 2021).

The key features of Wyoming DAO LLCs are as follows:

- obligation to keep a registered agent in Wyoming;
- legal name must include "DAO" or "LAO" (limited autonomous organisation), or "DAO LLC";

- member-managed unless the Articles of Organisation define it as algorithmically managed;
- the Articles of Organisation must include the DAO's smart contract and must be amended whenever the smart contract changes, and the contract will prevail in the event of any conflict with the Articles of Organisation;
- automatically dissolved when there are no proposals approved or actions taken in a one year period;
- laws governing regular Wyoming LLCs apply to DAO LLCs;
- members do not owe any fiduciary duties, unless the articles state otherwise.

Tennessee DAO

In April 2022, Tennessee amended its Limited Liability Company Act to include decentralised organisations (DOs). The requirements for Tennessee DO LLCs are nearly identical to those for Wyoming DAO LLCs, although the Tennessee law requires a quorum of a majority of members for a vote, while Wyoming allows a DAO's articles to define its quorum.

Colorado Uniform Limited Cooperative Association

Colorado has an innovative legal structure that can provide some DAOs adequate legal personality and limited liability. A limited cooperative association (LCA) is a mix of a corporation and an LLC. An LCA under the Colorado Uniform Limited Cooperative Association (CULCA) Act, is "an autonomous, unincorporated association of persons united to meet their mutual interests through a jointly owned enterprise primarily controlled by those persons." Unlike LLCs, a CULCA may have two types of members: patrons who conduct business for the CULCA, and investors who only make contributions. Patron members have financial rights, and a CULCA may disburse patrons' profits in proportion to their individual contributions or services; members may vote based on membership (one vote for each member) or on token holdings. A CULCA is governed by its articles and bylaws which allow for the integration of DAO-based governance principles.

Although in the United States a DAO seeking a legal identity may be organised under state law as a Vermont BBLLC, Wyoming LLC, Tennessee DO LLC or CULCA DAO, legal entities also remain subject to restrictions under federal law, such as the Investment Companies Act of 1940 and the Securities Exchange Act of 1934, addressing, for example, the maximum permissible number of members and whether any member can be a non-accredited investor without triggering registration, reporting or other requirements, obligations or penalties under such laws. Additionally, the Corporate Transparency Act, passed as part of the 2021 National Defense Authorisation Act, increases reporting requirements to the identification of

members of LLCs and LCAs, which may hamper the efforts of any DAO organised according to such entities to keep its members anonymous.

US unincorporated nonprofit association

An unincorporated nonprofit association (UNA) is a non-profit-making version of an LLC. Under the Uniform Unincorporated Nonprofit Association Act (UUNAA), an UNA is formed when two or more members join under an agreement – which may be oral, recorded, or inferred from conduct – with at least one common, non-profit-making purpose. Social, charitable or collector DAOs formed without a for-profit purpose might find it useful to become an UNA to order their activities and limit liability. Two facts to note: the UUNAA defines staking and liquidity-mining profits used to maintain a DAO's protocol as non-profit-making; and liability protection depends on the legal system, yet not all states recognise UNAs.

Europe

Switzerland

Few legal scholars have studied the recognition in the Swiss legal order of DAOs existing only on the internet (Riva, 2019/2020). Swiss law currently has no rule specifically governing DAOs. However, the current practice is to apply existing legal concepts known in Swiss law, especially the Swiss Code of Obligations and the Swiss Civil Code, to those entities as a DAO legal wrapper (Zharun, 2022). A DAO constructed as a Swiss Foundation may limit personal liability as the Swiss Foundation itself has legal personality.

Germany

It is not possible to make a generally valid statement as to how DAOs are to be classified under German law. Classification depends on the specific structure of the particular DAO (Uhink, 2023). According to Hahn, the DAO is best classified as the legal corporate entity of a partnership under civil law (*BGB-Gesellschaft* (Section 705 BGB: *Verfolgung eines gemeinsamen Zwecks*)) or general partnership (*Offene Handelsgesellschaft* (Section 105 I HGB: *Betrieb eines Handelsgewerbes*)) (Hahn, 2022). In practice, DAOs are usually internal companies under civil law (*Innengesellschaft bürgerlichen Rechts*), since the DAO as such is not the corporate body, but merely serves as a virtual framework that structures the activities of the participating members and channels their decision-making. DAOs in Germany cannot be qualified as companies sui generis, but are required to fit into one of the existing legally regulated forms. The participants of DAOs in Germany are accessory for all their liabilities (and if they participate in legal transactions) as joint and several debtors, if no implied or express exclusion of liability has been agreed in the external relationship. The DAO may, however, be interposed and recognised as an

association (decentralised autonomous association or DAA), which would enable the DAA as a limited liability wrapper act legally in external relations and at the same time would limit the liability of the DAO participants. The DAA then acts as a trustee that contracts with the outside world on behalf of the participants of the DAO. Claims and liabilities lie exclusively with the DAA as a trust company: its members are not liable for its activities.

The Netherlands

A DAO as such has no legal status in the Netherlands. As a result, if activities require registration, DAO project initiators have to register their mutual arrangements with the Chamber of Commerce (*Kamer van Koophandel*) as either a foundation, mutual society, association, group practice, sole trader, partnership (general or limited), limited company or public limited company. The matters to be transferred to the DAO must be determined at the time of creation of the legal entity.

Annex II Voting models

Most DAOs are governed through token-based voting, the simplest form of governance, in which each token grants one voting right. A majority of voters is required to pass a resolution. The majority may be absolute, with a pre-defined quorum having to be reached, or relative, with any majority being sufficient to pass a proposal. In quadratic voting, a larger number of tokens grant disproportionate voting power. This means that one token provides one vote, while two tokens provide four votes, three tokens provide nine votes, and so on. This voting mechanism has the advantage of incentivising ownership and commitment, but risks concentrating voting power in the hands of few large token holders (Ferreira, Li, and Nikolowa, 2022). In conviction voting, the weight of a vote increases the longer it remains unchanged. The positive aspect of this system is that it maintains a more stable voting environment. Holographic consensus voting is presented as a solution for the trade-off between resiliency and scalability. GenesisDAO uses holographic consensus voting. DAOs are launched with the idea of distributed decision-making. However, as in other situations with widespread ownership (e.g. public companies), small token or shareholders have little incentive to vote. An absolute majority is highly resilient, as at least 50% of members need to vote in favour of a resolution, but is not scalable when active participation is scarce. A relative majority enables more fluid decision-making, but may not be as democratic as desired, as a small number of voters can steer the organisation's strategy. Holographic consensus voting tries to resolve this trade-off. The holographic consensus is a multi-step voting process that involves the boosting of and betting on proposals (Faqir-Rhazoui, Arroyo, and Hassan 2021). Under the mechanism, members can predict whether proposals will pass or fail and bet on those they believe will be successful, using tokens. If the prediction is correct, the predictor receives a reward in the form of tokens, and if not, the predictor loses tokens. This ultimately allows for a small group of DAO members to help present the beliefs of the majority. Although this mechanism may be successful in expanding scalability and reducing the chances of attacks, as foul proposals need to be funded, a voting protocol of this kind may be financially demanding and difficult to adapt and maintain in the long term (Grace, 2022). Liquid democracy is another voting mechanism that tries to help with the resiliency problem using delegation. This system is similar to a representative democracy. However, unlike in a representative democracy, delegation in liquid democracy can be revoked at any time. This mechanism allows for greater accountability of decision-makers, at the expense of short-term thinking.

Annex III Comparison of DAOs and crowdfunding

DAOs operate through public and distributed decision-making, in which any DAO member may typically put forward proposals for any type of corporate decision and vote on them. This facilitates collaboration and community engagement among all members of the DAO that share common goals and ideals. These goals are diverse and codified in DAOs' underlying smart contracts. For example, DAOs may set out to raise and distribute donations or may collect and invest funds in promising venture projects. The funding of DAOs is often based on the sales of native tokens such as UNI, Comp, Aave, Sushiswap, Ox DAO, Decred, MKR and CRV (Blockchain Council, 2022) and NFTs (Bellavitis, Fisch and Momtaz, 2022). These token sales enable ventures to raise substantial amounts of funding from a crowd of investors; the funds may only be accessed with members' approval and smart contract operation. The tokens sold may carry voting rights, for which multiple voting mechanisms exist (see above). This is where DAOs differ from crowdfunding, due to their distinct organisational governance. In crowdfunding, entrepreneurs raise funding through the crowd, either through pure crowdfunding (e.g. Angel List) or through initial coin offering (ICO) (e.g. Coinbase) platforms. In both cases, there is a controlling party (i.e. the company that raises funds) that decides on the company strategy. In some cases, the CEO or entrepreneur might try to engage with their community and, for example, survey investors or customers on certain aspects of the company, such as product development. However, in crowd or ICO-funded ventures, the ultimate decision-making remains mostly centralised and top-down. In order to protect investors and the smooth operation of the market, the European Crowdfunding Regulation[31] lays down uniform requirements for providing crowdfunding services, for organising, authorising and supervising crowdfunding service providers, for operating crowdfunding platforms and for transparency and marketing communications when providing crowdfunding services in the European Union. The Crowdfunding Regulation also provides that, where a crowdfunding service provider provides payment services in connection with its crowdfunding services, it must be a payment service provider as defined in the Revised Payment Services Directive.[32]

Meanwhile, in a DAO, the organisation fundraises outside of regulatory frameworks by issuing tokens sold to a crowd of investors, as in an ICO, while its governance (in theory) is entirely public, automated and distributed. The decentralised nature of DAOs is said to enable new business models that are catalysts for further disintermediation and larger and more direct democratic processes.

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31 Regulation (EU) 2020/1503 of the European Parliament and of the Council of 7 October 2020 on European crowdfunding service providers for business (OJ L 347, 20.10.2020, p. 1).

32 Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market (OJ L 337, 23.12.2015, p. 35).

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