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Decentralized Autonomous Organizations (DAOs) Before State Courts

How can private international law keep up with global digital entities?

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1. Introduction

A Decentralized Autonomous Organization (DAO) is a social organization structure that allows several people to pool resources in order to achieve a common goal, with the characteristics of being an internet-native organization. While a precise definition of a DAO may prove elusive due to its adaptable nature for founders' requirements, it is still feasible to outline several distinguishing features. As of today, all DAOs have in common that they are blockchain-based organizations with governance rules inscribed on smart contracts.[1] In addition to being created and operated by technology, a DAO is collectively owned and managed by its members who are part of a community whose access is given by holding DAO's tokens. A DAO has a treasury that is only accessible with the approval of the DAO members and does not, in principle, have a hierarchical structure.[2]

That being said, it is not possible to draw up an exhaustive list of the different types of DAOs. Those digital entities exist on a wide spectrum, from social DAOs – that are a collection of people organized around a particular interest – to investment DAOs – that are a group of people who pool

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1 According to Vitalik Buterin, DAOs are the logical extension of smart contracts as they are nothing else than "long-term smart contracts that contain the assets and encode the bylaws of an entire organization." Vitalik Buterin, "Ethereum White Paper – A Next Generation Smart Contract & Decentralized Application Platform" (Blockchain Lab, November 2013) <https://blockchainlab.com/pdf/Ethereum_white_paper-a_next_generation_smart_contract_and_decentralized_application_platform-vitalik-buterin.pdf> accessed 1 June 2023. For an overview of the DAO's genesis, see Sven Riva, "Decentralized Autonomous Organizations (DAOs) in the Swiss Legal Order" (2019/2020) 21 Yearbook of Private International Law 601, 607-610; Samer Hassan and Primavera De Filippi, "Decentralized Autonomous Organization" (2021) 10(2) Internet Policy Review, 6, available at <https://policyreview.info/pdf/policyreview-2021-2-1556.pdf> accessed 1 June 2023.

2 Riva (n 1), 612-616, defined a DAO as "the entity created by the deployment of an autonomous and self-executing software running on a distributed system that allows a network of participants to interact and manage resources on a transparent basis and in accordance with the rules defined by the software code". Hassan and De Filippi (n 1), adopted the following definition: "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)".

capital and invest in projects.[3] For example, the first widely known DAO was a form of venture capital fund called "The DAO" which was launched in 2016 on the Ethereum blockchain; participants could submit projects to be funded and the decision-making process was distributed between the approximatively 10,000 token holders of The DAO.[4] Some DAOs are utilized in decentralized finance (DeFi) to operate protocols and applications on the blockchain network, facilitating the trading of digital assets for users. But DAOs can also be operating systems that enable more complex forms of DAOs to use their infrastructure to operate.[5] It has been observed that the goals of a DAO may undergo changes during its lifetime. However, DAOs that run operational protocols, such as DeFi DAOs, maintain a direct connection to the objectives of their respective protocols.[6] It is also worth mentioning that founding members can retain control over the DAO, or accept that their influence on governance will be diluted as new members acquire governance tokens. This shows that DAOs provide considerable flexibility when it comes to devising governance structures. In the concept that is adopted for this paper, DAOs are digital entities that are organizations constituted to pursue any purpose that could be reached by means of the various classical forms of companies.[7]

To this day, DAOs have garnered limited legal attention, with only a handful of jurisdictions taking steps to clarify their legal status through specific legislation. In the states where such legislation has been enacted, its scope is constrained, failing to encompass all forms of DAOs. Moreover, the existing legislation fails to consider the fundamental aspect that DAOs are inherently international entities, necessitating an initial analysis through the prism of private international law. Since DAOs play – and will keep playing – a key role in DeFi, providing them with a defined legal status would most likely promote the development of this alternative to traditional finance.[8] But the legal status of DAOs

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3 See *e.g.*, The UK Law Commission, "Decentralized Autonomous Organisations (DAOs) – Call for evidence" (November 2022), 9-22, available at <https://www.lawcom.gov.uk/project/decentralised-autonomous-organisations-daos> accessed 1 June 2023. The UK Law Commission stated that "it is important to recognise the inherent breadth and flexibility of the DAO organisational form", and defined a DAO as "a novel type of technology-mediated social structure or organisation of participants comprised of a variety of composite elements". *Ibid*., 9. For a taxonomy of DAOs, see also David Gogel, Bianca Kremer, Aiden Slavin and Kevin Werbach, Decentralized Autonomous Organizations: Beyond the Hype (World Economic Forum 2022), 13-15, available at <https://www3.weforum.org/docs/WEF_Decentralized_Autonomous_Organizations_Beyond_the_Hype_2022.pdf> accessed 1 June 2023. The definition of a DAO adopted in this report is: "A decentralized autonomous organization (DAO) is a general term for a group that uses blockchains and related technologies to coordinate its activities. *Ibid*., 6. See also Aaron Wright, "The Rise of Decentralized Autonomous Organizations: Opportunities and Challenges" (30 June 2021) Stanford Journal of Blockchain Law and Policy, available at <https://stanford-jblp.pubpub.org/pub/rise-of-daos/release/1> accessed 1 June 2023.

4 See Christoph Jentzsch, "Decentralized Autonomous Organization to Automate Governance" (2016) <https://archive.org/stream/DecentralizedAutonomousOrganizations/WhitePaper_djvu. txt> accessed 1 June 2023.

5 For example, Aragon and DAOstack are DAO platforms offering templates of DAOs that are preconfigured to undertake different types of projects. In this paper, the blockchain network as such is not included in the term "DAO". On this topic, Riva (n 1), 616, introduced a useful distinction between two forms of DAOs: "top layer DAOs" and "ground layer DAOs". The first form of DAOs corresponds to the notion, adopted in this paper, of a digital company. The second form of DAOs does not claim to function in a way similar to companies, their purpose being rather to serve as a payment mechanism by "issuing" a cryptocurrency or to enable other DAOs to use their infrastructure to operate. Bitcoin and Ethereum, for example, can be described as "ground layer DAOs" in this respect. As noted by Hassan and De Filippi (n 1), 3, "the term [DAO] is today 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".

6 Gogel, Kremer, Slavin and Werbach (n 3), 13.

7 See Florence Guillaume, "L'effet disruptif des smart contracts et des DAOs sur le droit international privé", in Alexandre Richa and Damiano Canapa (eds), Droit et économie numérique (Stämpfli 2021), 35-59, 46-47.

8 In a report on DAOs published by the World Economic Forum, the contributors acknowledge that "[p]erhaps the greatest threat to DAOs today is uncertainty. Without clear legal status, DAOs cannot take advantage of

remains highly uncertain, as demonstrated by the question of whether a DAO can be a party to proceedings in a state court.

DAOs are subject to disputes in the same way as any form of company or, more generally, any form of organization of persons regardless of its legal form. This paper will focus on civil or commercial disputes involving a DAO. Such disputes may arise among the members of a DAO, between the DAO and its members, and with third parties.[9] In theory, there are two different ways to resolve a dispute involving a DAO. The litigation can be submitted to a state court, on the one hand, or to a private dispute resolution mechanism such as arbitration or mediation, on the other hand. Each of these options has its advantages and disadvantages, which must be balanced when choosing a dispute resolution method. Among the criteria of choice, one must take into consideration, first of all, the capacity of a DAO to sue and to be sued before a state court. This capacity depends on the type of DAO and the jurisdiction where the lawsuit is filed.

Because of the uncertain legal status of DAOs, the same DAO may have capacity to act and defend in one state but not in another (2.). The choice of the forum will thus depend on the capacity of the concerned DAO to be a plaintiff or defendant in court. Furthermore, the jurisdiction of state courts raises delicate questions of private international law. It is indeed not a small task to determine where to file the claim (3.). However, before bringing a case before a state court, one must ensure that the decision on the merits will have the expected effect. It is therefore necessary to verify that the decision can be enforced in the event that the losing party does not comply with it spontaneously. This key issue can prove delicate in practice, particularly when enforcement is to take place on-chain (4.). When the resolution of a dispute involving a DAO is entrusted to a state court, the plaintiff will face several practical difficulties, such as the service of judicial documents on the defendant. This is the consequence of the pseudonymous environment of blockchain platforms, which frequently poses challenges in identifying the defendant (5.). Entrusting the resolution of a dispute involving a DAO to a private dispute resolution mechanism makes it possible to bypass the difficulties associated with proceedings before a state court. But the choice of the method of dispute resolution – state court versus private dispute resolution mechanism – depends mainly on the type of dispute and the parties involved (6.).

2. The capacity of a DAO to be a party to a state court proceeding

Before filing a lawsuit in a state court, it is necessary to ascertain the capacity of the parties to sue and to be sued. When the dispute involves a DAO that is likely to be a plaintiff or defendant in the proceedings, a distinction must be made according to the type of DAO.

2.1 Appearance of regulated DAOs before state courts

Some DAOs exist in a hybrid form, by which is meant that the DAO is governed not only by the computer code, but also by the company law of the state in which it is incorporated. There are currently a few jurisdictions, notably in the United States, that have enacted DAO legislation defining a legal status for such entities. The so-called "American model", adopted by Vermont[10], Wyoming[11],

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the same protections as corporations, such as legal personhood, limited liability and simplified tax arrangements". Gogel, Kremer, Slavin and Werbach (n 3), 8.

[9] See Florence Guillaume and Sven Riva, Blockchain Dispute Resolution for Decentralized Autonomous Organizations (DAO): The Rise of Decentralized Autonomous Justice (DAJ), Chapter 10, in Andrea Bonomi, Matthias Lehmann and Shaheeza Lalani (eds), Blockchain and Private International Law (Brill 2023), available at <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4042704> accessed 1 June 2023.

[10] Vermont Act No 205 (S.269), An act relating to blockchain business development <https://legislature.vermont.gov/Documents/2018/Docs/ACTS/ACT205/ACT205%20As%20Enacted.pdf> accessed 1 June 2023.

[11] Wyoming Act No 73 (SF0038), Wyoming Decentralized Autonomous Organization Supplement <https://legiscan.com/WY/text/SF0038/id/2359146> accessed 1 June 2023.

Tennessee[12] and more recently Utah[13], consists in authorizing the incorporation of DAOs in the form of a Limited Liability Company (LLC). A DAO based in Vermont is known as a blockchain-based LLC (BBLLC), Wyoming and Tennessee DAOs are referred to as DAO LLCs, and a DAO in Utah is identified as a Limited Liability DAO (LLD). In this case, the DAO and the LLC are "merged" as one, and the DAO just becomes a way for the company to organize itself using blockchain technology and to act in the Web 3 space.[14] This type of DAO whose code is consistent with the law of a state can be referred to as a "regulated DAO".

DAO legislation was also introduced in other jurisdictions, namely Malta[15] and the Marshall Islands[16]. Malta was a pioneer in this field by adopting the first DAO law, but this legislation did not prove to be adapted to the needs of DAO users. The Marshall Islands offer an off-shore LLC-based model that allowed the creation of non-profit DAOs before introducing a new law to also allow for-profit DAOs to be incorporated.

Furthermore, in some jurisdictions, existing company structures can be used to create a link between a DAO and the physical world.[17] This is the case, for example, in Switzerland, where DAOs are being attached to legal entities, mainly associations or foundations.[18] This type of arrangement is typically chosen to enable the DAO to outsource administrative tasks to a legal entity or delegate the management of the DAO's treasury to it. The DAO is thereby "materialized" and can, for example, enter into valid contracts with third parties, utilizing the association or the foundation as its representative in the physical world. Depending on its needs, a single DAO may use several legal entities, in different jurisdictions, for example to hold specific goods (*e.g.*, IP rights, property rights on a real estate), to carry out specific activities (*e.g.*, fundraising), and to obtain certain services (*e.g.*, holding a bank account). However, the concept can also be approached from another perspective, wherein an organization of persons (regardless of its legal structure) is attached to a DAO, using it as a management tool or as a means to access the Web 3 space. In this context, the question arises as to whether it remains a DAO or if it becomes an organization of persons that structures its governance through the utilization of a DAO, as is seen in the above-mentioned regulated DAOs.

These examples show that practice has developed several ways for allowing a DAO to carry out functions it would otherwise not be able to (*e.g.*, hiring employees, contracting with commercial partners, owning property), and thus making up for the lack of legislation. From a procedural perspective, when a DAO is attached to a legal wrapper, the latter in principle has the capacity to sue and be sued in court and therefore the DAO can be a party to litigation "through" the legal wrapper. However, even if the various legal wrappers offer practical solutions to DAO users, they entail a significant amount of legal uncertainty. In particular, the exact scope of the legal relationship between

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[12] Tenn. Code. Ann 48-250-101 et seq.; HB 2645, <https://www.tba.org/docDownload/1943411> accessed 1 June 2023.

[13] Utah Decentralized Autonomous Organizations Act; HB 357, <https://le.utah.gov/~2023/bills/static/HB0357.html> accessed 1 June 2023. This DAO law is not yet in force at the time of writing.

[14] See Guillaume and Riva (n 9), 11-15.

[15] Chapter 592, Innovative Technology Arrangements and Services Act <https://legislation.mt/eli/cap/592/eng/pdf> accessed 1 June 2023.

[16] Decentralized Autonomous Organization Act 2022, <https://rmicourts.org/wp-content/uploads/2022/12/PL-2022-50-Decentralized-Autonomous.pdf> accessed 1 June 2023.

[17] For an overview of the currently most commonly used legal wrappers, see Chris Brummer and Rodrigo Seira, Legal Wrappers and DAOs (30 May 2022), 6-19, available at <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4123737> accessed 1 June 2023. See also Wright (n 3), and Biyan Mienert, "How can a Decentralized Autonomous Organization be legally structures?" (1 December 2021) Legal Revolutionary Journal, available at <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3992329> accessed 1 June 2023.

[18] Similar legal structures are also available in other countries, notably the UK. See UK Law Commission (n 3), 37-44.

the DAO and the legal entity is unclear.[19] Moreover, attaching the DAO to a legal wrapper brings an element of centralization in the sense that the legal entity anchors the DAO in the territory of a particular state. This entails significant practical consequences when it comes to linking the DAO to a state using the rules of private international law.

These models established by practice must be distinguished from the DAOs which have a legal status granted by the law of a state. Today, the predominant focus lies on American limited liability companies (LLCs), namely the BBLCCs, DAO LLCs, and LLDs. True regulated DAOs are constituted and governed by the computer code *and* the company law of the state in which they are incorporated. When such a DAO has a legal personality granted by the law of its state of incorporation, there is no particular problem when it appears before the courts of that state. A DAO with legal personality can sue and be sued in its own name, as well as carry out business activities, have its own treasury, and enter into contractual relationships. For example, a Vermont BBLLC may appear in court in the same capacity as a standard LLC before Vermont courts. But its ability to sue and be sued in other jurisdictions depends on the scope of its recognition as a foreign legal entity in the forum state.[20]

This paper will not elaborate further on the resolution of disputes involving a regulated DAO. The focus will be on issues that arise in the context of resolving a dispute involving a DAO with no legal wrapper.

2.2 Appearance of maverick DAOs before state courts

The vast majority of DAOs currently in existence are constituted and governed only by computer code and are not formally linked to a legal entity. Such DAOs are not established under the law of a state and derive their existence solely from their code. Those DAOs – which "operate without any formal legal recognition, eschewing dependence on governmental authority for their existence"[21] – can be referred to as "maverick DAOs"[22]. When a dispute involves a maverick DAO, the question arises as to how to bring the defendant-DAO before a state court. Identifying the appropriate party to sue is indeed one of the primary challenges encountered while pursuing a DAO. In order to determine whether it is possible to sue the DAO itself, the plaintiff has to qualify the DAO in the legal order of the forum. The qualification process will establish the capacity or lack thereof to defend.

2.2.1 When the DAO qualifies as a company

Qualification is the process of classifying a fact into a category of law from which will derive a legal regime. The qualification of a DAO, in order to determine its legal status, is a complex operation when the legal order of reference (in principle, the legal order of the forum) does not know the DAO, because there is no proper category. In this case, qualification involves determining the legal institution of domestic law that has the most in common with the DAO being examined. Since DAOs exist as inherently international entities, the qualification must first be made at the level of private international law. This will allow the identification of the conflict of laws rule determining the law applicable to the DAO. The operation thus consists in classifying the DAO being examined into one of the categories of private international law.

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[19] Some authors have noted in this regard that there is a risk in some jurisdictions that a court may pierce the corporate veil of the legal wrapper to directly reach the DAO members. A court may pierce the veil if the legal entity is found to be operating as a mere extension or *alter ego* of its members. The separation between the legal entity and its members is thereby disregarded and individual members are held personally liable. This means that DAO members may still face potential personal liability despite the existence of a legal wrapper. See Brummer and Seira (n 17), 4.

[20] See Guillaume and Riva (n 9), 11-15 and 19-22.

[21] Brummer and Seira (n 17), 3.

[22] This terminology is borrowed from Riva (n 1), 619.

For example, in Swiss private international law[23], two different qualifications are likely to apply: the qualification as a company and as a contract. A DAO may be qualified as a company if it falls within the notion of "organized association of persons" or "organized unit of assets" in the sense of Article 150 para. 1 of the Swiss PILA.[24] This notion includes "all social combinations that have a social organization or that are at least organized as a whole".[25] The entity must therefore have an organized internal structure that is recognizable by third parties.[26] Whether a DAO qualifies as a company under Swiss private international law therefore depends on its level of internal organization. If a DAO is sufficiently organized, it will be governed by the law designated by the conflict of law rules applicable to companies.[27]

Switzerland adheres to the criterion of organization in matters of company law (Article 154 para. 1 of the Swiss PILA).[28] This principle dictates that an entity, once it meets the requirements to be qualified as a company (i.e., when it is sufficiently organized), is typically governed by the law of the state under which it is organized. Where the company has not been validly constituted under the law of the state under which it is organized, it shall be governed by the law of the state in which it is administered (Article 154 para. 2 of the Swiss PILA). The criterion of administration is consequently employed in a subsidiary manner within Swiss private international law when the primary connection to the state of organization cannot be used.[29] A company that has been validly constituted under foreign law, whether it be the law of its organization or the law of its administration, is automatically recognized in Switzerland.[30] When these rules are applied to a regulated DAO, like a Vermont BBLLC, it is probable for the DAO to be qualified as a company and subject to the laws of the state under which it is organized, namely Vermont law.[31] Under Swiss private international law, a BBLLC validly constituted under Vermont law would be automatically recognized as a company in Switzerland. As a result, the DAO would enjoy an equivalent legal status in Switzerland as it does in the state of Vermont, granting it, for instance, the ability to appear before Swiss courts.

The legal analysis becomes more intricate when dealing with a maverick DAO. The determination of whether such an entity qualifies as a company relies on the level of organization, necessitating a case-by-case examination. In general, a DAO has a social organization determined by the network of smart contracts that constitute its protocol. Even if the internal structure can be more or less organized, the code of a DAO necessarily defines the way the entity is governed. Furthermore, the governance is recognizable by third parties since the code is open source on the blockchain, at least on a public blockchain[32] (*e.g.*, Ethereum). In the author's opinion, the mere absence of a hierarchical structure (such as a board of directors or general assembly) in the organization of a DAO, instead utilizing a decentralized governance system, does not inherently exclude its qualification as a company.

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[23] Swiss private international law is codified in the Federal Act on Private International Law of 18 December 1987 (SR 291; the "Swiss PILA").

[24] Florence Guillaume, "Art. 150", in Andreas Bucher (ed), Commentaire romand: Loi sur le droit international privé – Convention de Lugano (Helbing Lichtenhahn 2011), No 4-8.

[25] Swiss Federal Council, "Message concernant une loi fédérale sur le droit international privé (loi de DIP)" (10 November 1982), FF 1983 425.

[26] Guillaume (n 24), No 3.

[27] See Riva (n 1), 622; Guillaume and Riva (n 9), 8-11.

[28] Florence Guillaume, "Art. 154", in Andreas Bucher (ed), Commentaire romand: Loi sur le droit international privé – Convention de Lugano (Helbing Lichtenhahn 2011), No 14. The criterion of organization corresponds to the criterion of incorporation. *Ibid.*

[29] Guillaume (n 28), No 16.

[30] Guillaume (n 28), No 40-44.

[31] Riva (n 1), 625-627.

[32] A public (permissionless) blockchain is freely accessible to all without authorization; Bitcoin and Ethereum, for example, are public blockchains. This term is opposed to private (permissioned) blockchains which are not open networks and for which access is subject to authorization; these blockchains are managed by a central authority, for example a bank or a state authority.

Furthermore, the fact that a DAO is administered solely on the blockchain on which it is operated and, possibly, on the internet insofar as the votes relating to the governance of the DAO are made online (*e.g.*, discussed on GitHub and executed on Snapshot) does not preclude a qualification as a company either. In the author's point of view, if the level of internal organization is sufficient, a maverick DAO can be qualified as a company under Swiss private international law.[33] But, as already indicated, this analysis must be carried out on a case-by-case basis, depending on the organizational characteristics of the DAO under review.

When the DAO being examined can be qualified as a company, this leads to an additional difficulty in determining the governing law. Under Swiss private international law, the law applicable to a DAO would in principle be the law of the state under which it is organized (Article 154 para. 1 of the Swiss PILA), subsidiarily the law of the state in which it is administered (Article 154 para. 2 of the Swiss PILA). With these criteria in mind, how can one determine the law applicable to a maverick DAO? A maverick DAO is, by definition, not linked to a legal order and is therefore not organized under the law of a state. The administration of the DAO is normally carried out online and is therefore not located within a state, at least when the governance is truly decentralized. Anchoring this type of DAO within the confines of a specific state would, therefore, be entirely artificial.[34] These two connecting factors (organization and administration) cannot therefore be applied to maverick DAOs. These criteria alone do not provide a means to ascertain the governing law for such DAOs, which in itself is not a surprising conclusion insofar as they are not legal entities. It should therefore be concluded that maverick DAOs cannot be recognized in Switzerland as foreign companies[35], cannot have legal personality in Switzerland and cannot appear before Swiss courts.

It is possible, however, to consider some exceptions where the place of administration test could apply to a maverick DAO, for example where participation in the DAO is restricted to persons residing in a particular state, thus providing for *de facto* administration in that state.[36] If participation in a maverick DAO is restricted, for example, to Swiss residents, the application to the DAO of the law of the state in which it is administered (i.e., Swiss law) will lead to examine whether the DAO can be qualified as a company under Swiss substantive law.[37] In our opinion, this qualification is appropriate in view of the fact that a DAO meets the four core elements of the concept of a company in domestic law: a contractual basis, a group of persons, a common goal, and a collaboration resulting in a union of efforts or resources.[38] It will then be necessary to identify the Swiss company form that bears the closest resemblances to the DAO under examination. This analysis may result in the application of legal

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33 Same opinion: Riva (n 1), 625-627.

34 Guillaume (n 7), 53-55.

35 The legal existence of maverick DAOs in Switzerland could only be recognized by adapting the system of determining the law applicable to companies to the particularities of DAOs. This would imply admitting that a company could legally exist without having been constituted under state law. Such a solution would make it possible to recognize the legal existence of a maverick DAO validly constituted under its code. See Riva (n 1), 631-637. In this respect, note that Swiss law is flexible enough to recognize the legal existence of a foreign company that was not validly constituted under the law of its incorporation if it was validly constituted under the law of the state where it is administered (Article 154 para. 2 of the Swiss PILA). See Guillaume (n 28), No 17. By expanding this rule somewhat, it would be possible to consider that the law of the state of administration equals to the code of the DAO inscribed on the blockchain.

36 In this particular case, the connection to the state of administration provided for in Article 154 para. 2 of the Swiss PILA leads to a real outcome. See Guillaume and Riva (n 9), 9-10.

37 The qualification under Swiss substantive law must be made, in principle, in accordance with the Swiss Code of Obligations (Federal Act on the Amendment of the Swiss Civil Code – Part 5: The Code of Obligations; SR 220; the "Swiss CO").

38 The four core elements of the concept of a company can be deduced from Article 530 para. 1 of the Swiss CO, which states that a company "is a contractual relationship in which two or more persons agree to combine their efforts or resources in order to achieve a common goal." See Guillaume (n 24), No 10.

rules associated with forms such as a simple partnership[39] or a limited liability company[40]. Ultimately, if it can be confirmed that the maverick DAO being examined has been validly constituted in accordance with the rules governing the Swiss company form that closely aligns with it (such as a Swiss simple partnership or a Swiss limited liability company), its legal existence can be recognized in Switzerland. The DAO's legal status, and in particular the existence of a legal personality and the ability to appear before Swiss courts, would depend on the legal status of the Swiss company into which it is transposed.

2.2.2 When the DAO qualifies as a contract

In the event that a maverick DAO does not fall under the notion of an "organized association of persons" or an "organized unit of assets" under Article 150 para. 1 of the Swiss PILA, it cannot be qualified as a company under Swiss private international law.[41] When the DAO being examined is not sufficiently organized to be qualified as a company, it must be qualified as a contract. This rule follows from Article 150 para. 2 of the Swiss PILA which states that "[s]imple partnerships that have not provided themselves with an organization are governed by the provisions […] relating to the law applicable to contracts".[42] Consequently, the DAO would not be qualified as a distinct legal entity; instead, it would be subject to contract law. In other words, the conflict of law rules applicable to companies cannot be applied to determine the law governing the DAO. Additionally, the DAO cannot be recognized as a company in Switzerland.

The qualification of the DAO as a contract (and not as a company) means that the connecting factors applicable to companies (organization and administration) are not relevant as such. It is therefore no longer the DAO as a separate entity that is taken into consideration in determining the applicable law, but the legal relationship among the DAO members. This arises from the understanding that the DAO is no longer perceived – in applying the private international law rules – as a separate social entity distinct from its constituent members. The legal relationship among the DAO members is governed by contract law (Article 150 para. 2 of the Swiss PILA). The contract between the DAO members is governed by the law chosen by the parties (Article 116 para. 1 of the Swiss PILA). A choice of law may be made in the smart contract code.[43] The chosen law must be carefully selected to ensure that it produces the desired legal effects on the relationships among DAO members. Among the legal effects that DAO members may seek, a few noteworthy ones include the recognition of the DAO's legal existence, the mitigation of personal liability for its members, and the capacity of the DAO to initiate legal actions. In addition to the choice of law, it is also possible to make a choice of court so as to ensure that a dispute between the DAO members is dealt with by the courts of a state that agrees to offer the protection of its judicial system for this type of legal relationship.[44]

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[39] See Article 530 para. 1 of the Swiss CO (n 38).

[40] Article 772 para. 1 of the Swiss CO states that "[a] limited liability company is a company with separate legal personality in which one or more persons or commercial enterprises participate. Its nominal capital is specified in the articles of association. It is liable for its obligations to the extent of the company assets".

[41] See *supra* 2.2.1.

[42] The term "simple partnership" is to be understood, in this context, as any form of association of persons (regardless of its legal form) that does not have a sufficient organization to qualify as a company within the meaning of Article 154 para. 1 of the Swiss PILA. Guillaume (n 24), No 10.

[43] In the author's opinion, a choice of law can be made either in the smart contract itself or in the blockchain on which the smart contract is recorded. See Guillaume (n 7), 56. It should be noted in this regard that the HCCH Principles on Choice of Law in International Commercial Contracts of 19 March 2015 (the "Choice of Law Principles") apply irrespective of the means through which the contract was concluded. They are thus applicable to contracts concluded by electronic means (see Commentary to the Choice of Law Principles No 1.9). In the author's opinion, the Choice of Law Principles should be also applicable to smart contracts and to DAOs, as long as the parties are acting in the exercise of their trade or profession.

[44] See Guillaume and Riva (n 9), 42-44. In the author's opinion, a choice of court can be made either in the smart contract itself or in the blockchain on which the smart contract is recorded. The HCCH Convention on Choice of Court Agreements of 30 June 2005 ("Choice of Court Convention") applies to contracts concluded "by any

In the absence of a valid choice of law, Swiss private international law stipulates that contracts are governed by the law of the state with which they have the closest connection (Article 117 para. 1 of the Swiss PILA). However, establishing such a connection becomes challenging when considering the contractual relationship among the members of a DAO, as this contract could potentially be qualified in various manners. In particular, one could argue that the members of a DAO are bound by a simple partnership agreement. It would then be appropriate to apply the law of the state in which the simple partnership carries out its principal activity or the law of the state where it is *de facto* administered.[45] These criteria could designate the state of residence of the founding members of the DAO if they still exercise a certain amount of control over the administration of the DAO, or the state of residence of the DAO members who manage it. In the author's opinion, if it is possible to identify such a state, this connection could lead to the application of the law of that state to the contract between the members of the DAO. However, in practice, if a maverick DAO is truly decentralized[46], establishing a connection with a specific state based on the criterion of the principal activity location or the *de facto* administration location becomes unfeasible.

If it is possible to identify a state with which the DAO has the closest connection and this state is Switzerland, the maverick DAO being examined would be governed by Swiss law. It would then be necessary to qualify the DAO in Swiss substantive law.[47] The qualification as a simple partnership may be the most appropriate in this context.[48] The relationships among the members of the DAO would then be governed by the rules applicable to the Swiss simple partnership.[49]

A simple partnership under Swiss law has no legal personality and has no capacity to act or defend in court. If a lawsuit was initiated for matters involving the DAO, proceedings could be initiated against each individual partner as the simple partnership does not offer a corporate shield. Under this legal regime, each partner is jointly and severally liable for the debts contracted within the framework

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[…] means of communication which renders information accessible so as to be usable for subsequent reference" (Article 3(c)(2)). This formulation implies contracts concluded by electronic means. This international instrument should therefore be applicable to smart contracts and DAOs. The courts of the contracting states of the Choice of Court Convention may therefore refer to this instrument to determine their jurisdiction on the basis of an exclusive choice of court included in a smart contract. Note that an exclusive choice of court could, of course, remove the jurisdiction of Swiss courts and render all reasoning under Swiss private international law useless.

45 Swiss Supreme Court, ATF 142 III 466, No 6.1.4.

46 Decentralization is a difficult concept to grasp in the context of a DAO. The term can refer to both the governance and the architecture of the DAO, which may lead to considering the level of decentralization of the blockchain system on which the DAO is deployed. It is also difficult to distinguish decentralization from the operational autonomy of the DAO. See Hassan and De Filippi (n 1). See also Josh Garcia and Jenny Leung, "Data Points to Measure Blockchain Network Centralization" (2020), available at <https://ketsal.com/wp-content/uploads/2020/10/Ketsal-Open-Standards-Measures-of-Blockchain-Network-Centralization-Oct-21-2020.pdf> accessed 1 June 2023; Gabriel Shapiro, "Defining Decentralization for Law" (2020), available at <https://lex-node.medium.com/defining-decentralization-for-law-58ca54e18b2a> accessed 1 June 2023. For simplicity's sake, in this paper, the term "truly decentralized DAO" refers to a DAO whose governance is truly decentralized. In this sense, MakerDAO would be a good example of a "truly decentralized DAO".

47 The application of Swiss law leads to a new qualification in Swiss substantive law, potentially distinct from the qualification previously made in private international law.

48 Guillaume and Riva (n 9), 7-8.

49 Articles 530 et seq. of the Swiss CO. See Matthias P.A. Müller, "Blockchain und Gesellschaftsrecht: ein Streifzug durch Möglichkeiten und Hürden: unter besonderer Berücksichtigung der Decentralized Autonomous Organization" (2019) Expert Focus: Schweizerische Zeitschrift für Wirtschaftsprüfung, Steuern, Rechnungswesen und Wirtschaftsberatung 485; Martin Hess and Patrick Spielmann, "Cryptocurrencies, Blockchain, Handelsplätze & Co. – Digitalisierte Werte unter Schweizer Recht", in Thomas U. Reutter and Thomas Werlen (eds), Kapitalmarkt – Recht und Transaktionen XII (Schulthess 2017), 145; Alexander F. Wagner and Rolf H. Weber, "Corporate Governance auf der Blockchain" (2017) Schweizerische Zeitschrift für Wirtschafts- und Finanzmarktrecht 59, 67.

of the partnership. In other words, if a DAO is a Swiss simple partnership, the plaintiff can pursue any one member of the DAO for the entirety of their loss. The application of the rules on simple partnership therefore presents a significant risk for DAO members. However, in the author's opinion, the rules governing a Swiss simple partnership are not fit for DAOs.[50] Demanding that every member in a maverick DAO assumes responsibility beyond their initial contribution is unjust, particularly in the case of having governance tokens that solely grant voting privileges in the DAO's decision-making process. This is especially true when the DAO comprises thousands of pseudonymous members. In addition, there are instances where individuals may not even be aware of their membership in a DAO, particularly when they received governance tokens through an airdrop. Furthermore, the pseudonymity of DAO members contradicts the personal structure of the simple partnership, which requires the partners to be faithful and loyal to each other.

The foregoing analysis shows that it is a legally challenging undertaking to determine the legal nature of maverick DAOs. Furthermore, the solution could differ from one DAO to another, and from one jurisdiction to another.[51] In Switzerland, the key consideration revolves around determining whether a maverick DAO possesses adequate organization to be qualified as a company. If so, the relationships among the DAO members would be governed by company law. However, if a DAO is not sufficiently organized to be qualified as a company, the relationships among its members would be contractual in nature. Depending on the qualification, the DAO would be recognized in Switzerland as a company and be able to appear before the Swiss courts in its own name. Nevertheless, the qualification of the DAO may vary across jurisdictions, potentially leading to a scenario where the same DAO can have the legal authority to initiate and defend lawsuits in one jurisdiction while lacking it in another. The choice of the forum will thus depend in particular on this issue.

3. Determining jurisdiction for a dispute involving a DAO

A dispute involving a DAO is, in most cases, international in nature. It is therefore the rules of private international law of each state that will determine in which cases their courts have jurisdiction to rule on a civil or commercial case involving a DAO. There are no conflict of jurisdiction rules adopted at the supra-national level with a worldwide scope determining the jurisdiction of state courts in civil or commercial matters.[52] The lack of coordination between states in this respect means that proceedings may well be brought before the courts of several states. Thus, it will be the responsibility of the plaintiff to select the forum that offers the most favorable outcome by carefully evaluating the benefits and drawbacks of the different available options. Given the uncertainty of a DAO's ability to appear before state courts, the choice of forum will depend primarily on the DAO's ability to sue or be sued in its own name.

In some cases, the plaintiff will prefer to take action against the DAO itself, while in other cases, action against the members of the DAO (or some of them) will prove to be a better solution. It may well happen that the liability of the DAO members is preferred to that of the DAO itself. These elements (and others) will have to be weighed against the circumstances of the case and the law that will apply on the merits. When the plaintiff is the DAO, it will also face difficulties to bring a claim before a state court. In particular when it does not have the capacity to sue in its own name, it may be very complicated to determine who should file the lawsuit in the DAO's name, especially when the DAO is truly decentralized and brings together a vast network of pseudonymous members located across the globe.

The challenges that a plaintiff will encounter in the process of bringing a defendant-DAO before a state court will be illustrated in this paper by considering three types of disputes: disputes pertaining

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[50] Same opinion: Guillaume and Riva (n 9), 8; Hess and Spielmann (n 49), 191-192.

[51] For an analysis of the legal situation in the UK, see UK Law Commission (n 3), 23-36.

[52] In case where the parties agreed on a choice of court, the Choice of Court Convention (n 44) may apply. This convention is in force in 33 states.

to DAO governance, contractual disputes, and tort-related disputes. Private international law rules must be used to determine which courts have jurisdiction over a dispute related to the governance of a DAO, as well as a dispute in contract or tort-related matters involving a DAO. For the sake of convenience, it will be assumed that the jurisdiction issue arises before the Swiss courts. Even if the conflict of jurisdiction rules are not unified at the supra-national level, they are sufficiently similar in the various countries for the reader to be able to apply the reasoning in their legal system of reference.

3.1 Disputes related to the governance

A dispute related to the governance of a DAO could be, for example, a dispute over the compliance of a proposal with the DAO's constitution. In order to determine the forum for such an action, the first question to be resolved is qualification. As was seen above[53], under Swiss private international law, a maverick DAO may be qualified as a company if it demonstrates sufficient organization; alternatively, if its internal organization is deemed insufficient, it is qualified as a contract.

3.1.1 When the DAO qualifies as a company

When a maverick DAO qualifies as a company[54], a dispute over the governance of the DAO can be characterised as a company law matter and shall be settled in accordance with the law governing the DAO. As was seen above, it is quite difficult to determine in practice the law applicable to a DAO.[55] The same difficulties are encountered in determining the jurisdiction.

Under Article 151 para. 1 of the Swiss PILA, actions against the company, its shareholders or members, or persons liable under company law are subject to the jurisdiction of the Swiss courts at the seat of the company. A dispute over the governance of the DAO is therefore prone to falling under the jurisdiction of the Swiss courts at the seat of the DAO. The Swiss courts also have to apply Article 22 para. 2 of the Lugano Convention[56], which establishes an exclusive jurisdiction before the courts of the state in which the company has its seat in proceedings which have as their object the validity of the decisions of the organs of a company.[57] The question will therefore arise as to whether a DAO could be qualified as a company within the meaning of the Lugano Convention, which would lead to the application of this conflict of jurisdictions rule. The notion of company in the sense of the Lugano Convention must be interpreted autonomously. In the author's opinion, it should be the same as the one used in Swiss law when determining the jurisdiction of the Swiss courts.[58] In Switzerland, the seat of a company is deemed to be located at the place designated in the articles of incorporation (i.e., the statutory seat or registered office) or, in the absence of such a designation, the seat is located at the place where the company is administered in fact (i.e., the administrative seat).[59]

Applying these rules to locate in Switzerland a dispute related to the governance of a DAO leads to great difficulties. It is usually impossible to determine where the seat of a maverick DAO is located.[60] There is no place of incorporation, which means that the criterion of the statutory seat or

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53 See *supra* 2.2.

54 See *supra* 2.2.1.

55 See *supra* 2.2.1.

56 Convention on jurisdiction and the recognition and enforcement of judgements in civil and commercial matters of 30 October 2007 ([2007] OJ L 339/3; the "Lugano Convention").

57 The same rule can be found in Article 24 para. 2 of the EU Regulation No 1215/2012 of the European Parliament and of the Council of 12 December 2012 on jurisdiction and the recognition and enforcement of judgements in civil and commercial matters ([2012] OJ L 351/1; the "Brussels Ibis Regulation"), which applies in Member States of the European Union.

58 Florence Guillaume, "Art. 22 CL", in Andreas Bucher (ed), Commentaire romand: Loi sur le droit international privé – Convention de Lugano (Helbing Lichtenhahn 2011), No 40.

59 Article 21 para. 2 of the Swiss PILA. This rule also applies when the jurisdiction of the Swiss courts is to be determined on the basis of Article 22 para. 2 of the Lugano Convention.

60 See *supra* 2.2.1.

registered office fails to link a maverick DAO to a state. Even if the code of a DAO could be considered as a company's articles of incorporation, it is very unlikely that a maverick DAO would designate a seat in its protocol. Furthermore, there is no place of administration that could point to a state. The criterion of the administrative seat fails to create any link with a state because a maverick DAO is a community of pseudonymous members spread around the world who jointly manage the operations of the entity through online platforms. Thus, the criterion of the administrative seat can only point to the internet or the blockchain itself. It is therefore unlikely that the plaintiff will be able to establish a sufficient link between a maverick DAO and the jurisdiction of Swiss courts.

Therefore, if disputes related to the governance of a DAO are matters of company law, connecting factors of Swiss private international law fail to link those disputes to Switzerland. The same conclusion can be reached for other jurisdictions. Even though the connecting factors used in other states for determining the jurisdiction of their courts are not necessarily identical to those in Switzerland, they are very similar. It is therefore likely that it will not be possible to establish a sufficient link between a maverick DAO and the jurisdiction of a state court. This situation leads to a negative conflict of jurisdiction, meaning that no state has jurisdiction over issues pertaining to the governance of a maverick DAO. This could lead state courts to admit jurisdiction on the basis of weak or artificial links between the DAO and their jurisdiction.[61]

However, there are some exceptions worth mentioning in this context where it could be possible to recognize the existence of an administrative seat. For example, when the members of a maverick DAO all reside in one state, the place of administration of the DAO may be anchored in that state. For example, the members of NEDAO[62] must be residents of the Canton of Neuchâtel in Switzerland. In case of a dispute pertaining to the governance of NEDAO, Swiss courts – and more precisely the courts of the Canton of Neuchâtel – could have jurisdiction over the case based on the criterion of the administrative seat. Another similar situation arises when the DAO is attached to a legal entity, such as a Swiss association, to outsource administrative tasks to that entity. If it can be established that the legal entity is responsible for the administration of the DAO, it is plausible that Swiss courts located at the seat of that entity would have jurisdiction over any disputes pertaining to the governance of the DAO.

3.1.2 When the DAO qualifies as a contract

When a maverick DAO does not qualify as a company, then it must be qualified as a contract under Swiss private international law.[63] In this case, disputes related to the governance of a DAO are matters of contract law.

The jurisdiction of Swiss courts is determined by the conflict of jurisdiction rules applicable to contractual matters. These rules provide for action before the Swiss courts of the defendant's domicile or those of the place of the performance of the contract. They will be detailed below with respect to a contractual dispute involving a DAO.[64] At this point, it suffices to say that locating a forum in Switzerland for the purpose of bringing an action relating to the governance of a DAO will be complicated in practice when the DAO is not perceived as a social entity distinct from its members. The conflict-of-jurisdictions rule in this case focuses on the legal relationship among the members of the DAO and is difficult to apply, especially when it is not possible to anchor said legal relationship within the boundaries of a state. It is of course possible to remedy this legal uncertainty by agreeing on a choice of court. For

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61 When no state can provide an effective forum, there is no alternative but to consider that state courts should exercise universal jurisdiction. See Guillaume and Riva (n 9), 26-27.

62 NEDAO is a DAO being developed as a community project for the people of the Canton of Neuchâtel in Switzerland. To join NEDAO, members must have their public key certified with the residents' office to prove that they reside in the Canton of Neuchâtel. However, their pseudonymity is safeguarded as their public key is not linked to their identity.

63 See *supra* 2.2.2.

64 See *infra* 3.2.

example, a choice of court clause could be inserted in the protocol of the DAO.[65] Such a choice of court should in principle be binding on the DAO members. They would then have to submit all disputes relating to the governance of the DAO to the state courts designated in the choice of court clause.

When Swiss courts have jurisdiction, the dispute shall be settled in accordance with the law chosen by the parties if there is a valid choice of law (Article 116 para. 1 of the Swiss PILA) or, failing that, under the law of the state with which the contract between the DAO members has the closest connection (Article 117 para. 1 of the Swiss PILA). As was mentioned above[66], this connection is difficult to apply to the contract between the members of a maverick DAO which is truly decentralized. But, in some cases, it could be possible to establish a close connection with a specific jurisdiction on the basis of the criterion of the place of the principal activity or the place of the *de facto* administration. When a connection can be established with Switzerland, allowing for the application of Swiss law to the relationships among the DAO members, it is likely that the regulations governing simple partnerships will become applicable.[67]

3.2 Disputes of a contractual nature

A dispute of a contractual nature involving a DAO could be, for example, a dispute with a contractual partner caused by the non-execution or improper execution of a smart contract. Mistakes in the process of converting the terms of the legal contract[68] into the code of the smart contract, errors in the code or bugs, as well as unforeseen circumstances that were not programmed in the smart contract may lead to unwanted outcomes in the execution of the smart contract. A conflict can also emerge due to disparities in the interpretation of the smart contract's code, such as when an external source (referred to as an "oracle") misinterprets a factual element, leading to the execution of the smart contract in an unintended manner. For example, it may happen that the oracle relies on a non-updated exchange rate of a cryptocurrency and executes the transaction at an outdated rate.[69] A party to a smart contract can also feel aggrieved when the smart contract executes as planned, but the result contravenes principles of fairness and justice. All those situations may be qualified as contractual matters in the legal orders that recognize a contractual scope to a smart contract.[70]

Assuming that a relationship between a DAO and a third party defined by a smart contract can be qualified as a contractual relationship in the legal sense, it is possible to use connecting criteria

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65 See *supra* 2.2.2.

66 See *supra* 2.2.2.

67 See *supra* 2.2.2.

68 Legal contracts are contracts that are legally binding upon the parties. In this paper, the term "legal contract" refers to an underlying traditional contract to which the smart contract is linked. In this situation, the smart contract may serve to perform one or more contractual provisions on-chain; the smart contract may also be a simple reproduction of the legal contract which is legally binding upon the parties. Smart contracts are not necessary linked to an underlying traditional contract and can exist by themselves. In this case, the smart contract may be the legal contract itself.

69 See *e.g.*, the allegations from investors who suffered heavy losses on the MakerDAO platform on 12 March 2020. United States District Court, Northern District of California, order of 22 February 2023 in the *Peter Johnson v. Maker Ecosystem Growth Holdings Inc. et al.* litigation (Case Number 20-cv-02569-MMC), available at <https://law.justia.com/cases/federal/district-courts/california/candce/3:2020cv02569/358097/82/> accessed 1 June 2023. This class-action lawsuit filed against entities associated with MakerDAO, in which the plaintiffs alleged that the platform misrepresented the risks of holding collateral debt positions, has been dismissed.

70 See Guillaume (n 7), 43-46. On the legal scope of smart contracts in Switzerland, see *e.g.*, Olivier Hari and Ulysse Dupasquier, "Blockchain And Distributed Ledger Technology (DLT): Academic Overview Of The Technical And Legal Framework And Challenges For Lawyers" (2018) 5 International Business Law Journal 423, 443-444; Blaise Carron and Valentin Botteron, "Le droit des obligations face aux 'contrats intelligents'", in Blaise Carron and Christoph Müller (eds), 3e Journée des droits de la consommation et de la distribution, Blockchain et Smart Contracts – Défis juridiques (Helbing Lichtenhahn 2018), 1.

provided for by the rules of private international law to connect the contractual relationship to a jurisdiction. A dispute shall be settled before Swiss courts in accordance with the law chosen by the parties if there is a valid choice of law (Article 116 para. 1 of the Swiss PILA) or, failing that, under the law of the state with which the contract has the closest connection (Article 117 para. 1 of the Swiss PILA). With regard to jurisdiction in contractual matters, the connecting criteria used in Switzerland refer either to the location of the parties or to the location of the contractual relationship itself.

In contractual matters, the first rule of jurisdiction to be considered is the forum of the domicile of the defendant. For example, Swiss courts have jurisdiction to hear disputes arising from a contract primarily when the defendant has its domicile in Switzerland (Article 112 para. 1 of the Swiss PILA and Article 2 para. 1 of the Lugano Convention[71]). Generally speaking, the seat of a company is deemed to be the domicile.[72] Failing any statutory seat or registered office, the seat is in principle deemed to be at the place where the company is administered in fact.[73] But, as was mentioned above[74], it is in principle not possible to establish the location of the administrative seat of a maverick defendant-DAO for the purpose of determining a forum. These conflict-of-jurisdiction rules, based on the location of the DAO, do not therefore make it possible to establish the jurisdiction of Swiss courts.

If a DAO bound under a smart contract suffers economical damage due to the non-execution or improper execution of the smart contract, locating the other party could open a forum at the domicile of the defendant, potentially giving jurisdiction to the courts of that state. The main challenge when a DAO seeks to file a claim against a third party lies in the identification of said party, enabling the DAO to initiate legal proceedings in a state court. As on-chain actors primarily act pseudonymously in the blockchain environment, it may be impossible to identify the person behind a wallet address and locate their domicile or their seat.[75] In the blockchain environment, the pseudonymity of the parties is an impediment to filing a lawsuit. It is indeed not possible to sue a person whose identity is not known in civil or commercial matters. That being said, it is becoming more and more easy to determine the identity of a person who uses the blockchain.[76] But since identifying a user is still complicated and expensive, the financial claim must be important enough to justify the costs related to the identification. If this is not the case, the pseudonymity of the parties is a significant problem for access to justice. And, of course, the issue of the capacity of a DAO to sue in its own name remains.

There are alternative forums for resolving contractual disputes that take into account the location of the contractual relationship itself, such as the forum at the place of performance of the

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[71] The same rule can be found in Article 4 para. 1 of the Brussels Ibis Regulation, which applies in Member States of the European Union.

[72] See *e.g.*, Article 21 para. 1 of the Swiss PILA: "For companies […], the seat is deemed to be the domicile". Under Article 60 para. 1 of the Lugano Convention, "a company […] is domiciled at the place where it has its: (a) statutory seat; or (b) central administration; or (c) principal place of business". The same rule can be found in Article 63 para. 1 of the Brussels Ibis Regulation, which applies in Member States of the European Union.

[73] See *e.g.*, Article 21 para. 2 of the Swiss PILA*:* "The seat of a company is deemed to be located at the place designated in the articles of incorporation or in the articles of association. In the absence of such a designation, the seat is located at the place where the company is administered in fact".

[74] See *supra* 3.1.1.

[75] See Wulf A. Kaal and Craig Calcaterra, "Crypto Transaction Dispute Resolution" (2017-2018) 73 The Business Lawyer 109, 133, who are of the opinion that it is impossible to locate the parties to a smart contract transaction.

[76] See *e.g.*, Péter L. Juhász, József Stéger, Dániel Kondor and Gábor Vattay, "A Bayesian approach to identify Bitcoin users" (2018) PLoS ONE 13(12): e0207000, available at <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0207000> accessed 1 June 2023. See also Christiaan Vos, "Are Bitcoin transactions anonymous and traceable?" (Cointelegraph, 3 September 2022), <https://cointelegraph.com/explained/are-bitcoin-transactions-anonymous-and-traceable> accessed 1 June 2023.

contract.[77] However, locating the performance of a smart contract in a state jurisdiction is virtually impossible as the execution of a smart contract occurs exclusively on-chain.[78] This challenge can be exemplified by a transaction conducted through the Uniswap protocol. Uniswap is a decentralized exchange (DEX) operating on the Ethereum blockchain, where users retain direct control over their funds. It enables users to trade ERC-20 tokens without the need for a third-party custodian. When a user intends to exchange one token for another, they can simply send their token to the Uniswap smart contract and receive a corresponding amount of the other token. The smart contract automatically calculates this amount based on the prevailing market price. The protocol Uniswap is owned and governed by the token holders of Uniswap DAO which is a truly decentralized maverick DAO. In the event that an individual manages to manipulate the market to their advantage when trading ERC-20 tokens, it may give rise to concerns regarding the proper execution of the smart contract. In such a scenario, how could the jurisdiction for a claim by an aggrieved party be determined by locating the performance of the smart contract within the borders of a specific state?

The foregoing observations are also valid, *mutatis mutandis*, for a dispute between a DAO and a contractual partner caused by the non-execution or improper execution of a legal contract. In addition, in this case, there is a significant risk, as the law stands, that a state court would consider that a maverick DAO does not have the power to enter into a contractual relationship and be entitled to rights and obligations of any kind in its own name. The rights and obligations of the DAO could be transferred to the DAO members assuming that at least one of them would be identifiable, and each identified member could be personally liable for the obligations of the DAO. Moreover, in cases where the DAO is attached to a legal entity (*e.g.*, a Swiss association), for instance to delegate administrative tasks to that entity, the issue of the legal relationship between the DAO and the legal entity remains.[79] It will indeed be necessary to determine between the DAO and the legal wrapper, which one is engaged in the contractual relationship with the third party. The resolution of this question hinges upon the presence of a valid legal relationship between the DAO and the attached legal entity.

3.3 Disputes of a tortious nature

In matters relating to tort, the domicile of the defendant[80] and the place where the tort occurred are typically the decisive connecting factors for determining jurisdiction. The place of the tort can usually be located at the place of commission of the wrongful act and at the place where the damage occurs.[81] Again, it is difficult to identify these locations when the act is committed on-chain due to the ubiquitous nature of the tort. In this matter, the determination of the forum based on the location of the tort cannot be identified in general terms, as it will depend on the specific type of tort involved.

A dispute of a tortious nature involving a DAO could be, for example, a dispute related to the alleged negligence of the DAO in its handling of the security of the protocol. A California court had to consider such an action in the bZx DAO case where the plaintiffs hold the defendants liable for their

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[77] See *e.g.*, Article 113 of the Swiss PILA: "If the characteristic obligation of the contract is to be performed in Switzerland, the action may also be brought before the Swiss court at the place of performance". Article 5 para. 1 of the Lugano Convention provides also for a forum in the courts of "the place of performance of the obligation in question", as well as Article 7 para. 1 of the Brussels Ibis Regulation, which applies in Member States of the European Union.

[78] See Guillaume and Riva (n 9), 24-26.

[79] See *supra* 2.1.

[80] See *e.g.*, Article 129 of the Swiss PILA: "The Swiss courts at the domicile […] of the defendant have jurisdiction to hear actions in tort" and Article 2 para. 1 of the Lugano Convention; Article 4 para. 1 of the Brussels Ibis Regulation for Member States of the European Union.

[81] See *e.g.*, Article 129 of the Swiss PILA: "The Swiss courts at the place where the act or the result occurred […] have jurisdiction" to hear actions in tort. The same rule can be found in Article 5 para. 3 of the Lugano Convention, under which "the courts of the place where the harmful event occurred" have jurisdiction in matters relating to torts; exactly the same rule is also found in Article 7 para. 2 of the Brussels Ibis Regulation, which applies in Member States of the European Union.

losses following a hack of the protocol that was managed by the DAO.[82] In this proceeding, the plaintiffs argued that bZx DAO – which was a maverick DAO – was to be qualified as a general partnership under California law. This qualification is indicative of the fact that legal scholars usually try to apply by analogy existing company law rules of their own jurisdiction to define the legal regime of maverick DAOs. The plaintiffs thus had to demonstrate the existence of a general partnership and argued that all the holders of the governance tokens of bZx DAO were members of the general partnership. They were able, on this basis, to bring the action for damages against some of the DAO "partners" and argued that the defendants were jointly and severally liable for their losses as members of a general partnership.

In a recent preliminary ruling[83], the California court addressed the issue of its jurisdiction and pointed out that when the action is brought against the partners of a general partnership, personal jurisdiction must be verified for each partner. The court had to verify its jurisdiction over one of the founders of bZx DAO who did not reside in California, as California's long-arm statute allows the exercise of personal jurisdiction over a non-resident defendant only if they have certain minimum contacts with California[84]: "Calfornia court[s] ha[ve] jurisdiction over only those individual partners who personally established the requisite minimum contacts with California".[85] Hence, the exercise of personal jurisdiction over a non-resident defendant is permitted only if they have certain minimum contacts "such that the maintenance of the suit does not offend traditional notions of fair play and substantial justice" in accordance with the requirement of due process under the U.S. Constitution.[86] The California court also recalled that it may exercise either general or specific jurisdiction over a non-disputed defendant.[87] The former is possible when the defendant has substantial or continuous and systematic contacts with the forum state, while the latter can be exercised if several conditions are met, among which the defendant must have purposefully directed their actions at the forum state in matters relating to tort.[88] In the preliminary ruling, the California Court held that the plaintiffs failed to demonstrate that the defendant had sufficient contacts with California for the court to exercise jurisdiction over him.

This ruling shows how difficult it is to establish jurisdiction not on the location of the parties (*e.g.*, the domicile of the defendant) but on the location of the tort. Although it is undeniable that the place where the tort occurred helps to anchor the dispute in the jurisdiction of the court, determining this place is extremely difficult when the wrongful act is committed on-chain. A tort resulting from any activity carried out on the internet is characterized by its ubiquitous nature, which leads to considerable legal uncertainty. The result is a multiplication of international forums, since online data is universally distributed and can be consulted instantaneously by an indefinite number of internet users anywhere

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82 See Complaint document filed by Christian Sarcuni et al. v. bZx DAO et al. (2 May 2022) before the United States District Court, Southern District of California (Case Number 22-cv-618-LAB-DEB), available at <https://www.classaction.org/media/sarcuni-et-al-v-bzx-dao-et-al.pdf> accessed 1 June 2023. See also Florence Guillaume and Sven Riva, "How to Resolve a Dispute Involving a DAO" The FinReg Blog (21 July 2022), available at <https://sites.duke.edu/thefinregblog/2022/07/21/how-to-resolve-a-dispute-involving-a-dao/> accessed 1 June 2023.

83 United States District Court, Southern District of California, order of 27 March 2023 in the ongoing *Christian Sacuni et al. v. bZx DAO et al.* litigation (Case Number 22-cv-618-LAB-DEB), available at <https://casetext.com/case/sarcuni-v-bzx-dao> accessed 1 June 2023.

84 For the minimum contact test, see *International Shoe v. State of Washington*, 326 U.S. 310 (1945): "due process requires only that, in order to subject a defendant to a judgment *in personam*, if he be not present within the territory of the forum, he have certain minimum contacts with it such that the maintenance of the suit does not offend traditional notions of fair play and substantial justice."

85 *Christian Sacuni et al. v. bZx DAO et al.* (n 83), 23.

86 *Christian Sacuni et al. v. bZx DAO et al.* (n 83), 22.

87 *Christian Sacuni et al. v. bZx DAO et al.* (n 83), 22. For the general and specific jurisdiction, see *Helicopteros Nacionales de Columbia v. Hall*, 466 U.S. 408 (1984).

88 *Christian Sacuni et al. v. bZx DAO et al.* (n 83), 22. For the specific jurisdiction in tort matters, see *World-Wide Volkswagen Corp. v. Woodson*, 444 U.S. 286 (1980); *Picot et al. v. Weston*, 780 F.3d 1206 (9th Cir. 2015). For the purposeful contacts test, see *Burger King Corp. v. Rudzewicz*, 471 U.S. 462 (1985).

in the world. For this reason, jurisdiction is typically not limited solely to online service accessibility, but instead necessitates a specific connection with the forum (i.e., "minimum contacts" in American terminology). In the U.S., when the defendant was not present in the state in which the online unlawful act was committed, they must have acted intentionally or, at the very least, must have purposefully directed their actions at the forum state. It can be assumed that "[t]he defendants in such cases have potentially established purposeful contacts with the forum state so that they could have reasonably anticipated being sued there."[89]

It is worth noting that, in the bZx DAO case, even though the plaintiffs argue that bZx DAO is a general partnership, they are only holding responsible core members who have or had a great amount of control over the DAO's protocol and who, according to the plaintiffs, "owed [them] a duty to maintain the security of the funds deposited using the bZx protocol". In the author's opinion, it would be much harder to argue that participants who had small amounts of voting rights in bZx DAO are also liable for the damage, even if they had some decision power within the organization. As a result, it appears that different categories of members could bear different levels of responsibilities, putting identifiable core developers and core members of a DAO at greater risk of liability in case of a damage.

This liability scheme would resemble that of a limited partnership under Swiss law, where general partners who oversee and run the business have unlimited liability, while limited partners have limited liability up to the amount of their investment.[90] This U.S. decision could be of interest if Swiss law were to apply to the tort liability of members of a DAO. It raises the question of the most appropriate qualification under Swiss law for a maverick DAO: should it be classified as a limited partnership, a limited liability company, or a simple partnership? On the one hand, this issue pertains to the internal relationship among the DAO members who would bear liability for any wrongful act. It determines, among other things, whether each member is jointly and severally liable for the debts incurred by the DAO and their right to seek recourse against a co-debtor. On the other hand, it plays a crucial role in determining whether the plaintiff can pursue any individual member of the DAO for the full extent of their losses.

As for the law governing tort liability as such, a Swiss court would in principle apply the law of the state in which the tort was committed or, in some circumstances, the law of the state where the result occurred, in the absence of a choice of law.[91]

4. Enforcement of a decision rendered by a state court

Challenges to seeking justice in case of a dispute involving a maverick DAO do not end with finding a court with jurisdiction over the dispute. Even if a state court has jurisdiction and renders a decision on the merits, the aggrieved party may find it impossible to seek the enforcement of the decision when the losing party does not comply spontaneously.[92]

The immutability that characterizes blockchain technology does not allow any authority to modify the state of the blockchain ledger, at least when the blockchain is public[93] (*e.g.*, Bitcoin, Ethereum). Hence, state authorities have no enforcement power over crypto-assets: crypto-assets cannot be frozen, seized, or confiscated without control over the holder's private key. This can present a significant practical challenge as crypto-assets can be transferred swiftly and with ease. If smart contracts have been improperly executed, state authorities cannot exercise their enforcement power to adapt the execution of smart contracts, to stop them from executing all together, or to restore the initial situation. They cannot enforce court decisions related to the governance of a DAO either, because

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89 Robert L. Felix and Ralph U. Whitten, American Conflicts Law (6th edn, Carolina Academic Press 2011), N 22, 71.

90 Guillaume and Riva (n 82). See Article 594 of the Swiss CO.

91 See Article 133 of the Swiss PILA.

92 See Guillaume and Riva (n 9), 27-29.

93 In this paper, the term "blockchain" refers to a public blockchain. See *supra* n 32.

the governance rules of a DAO are inscribed on immutable smart contracts and can only be changed by the DAO's members according to the governance rules themselves.[94]

The inability of states to exercise their enforcement power on the blockchain means that the enforcement of court decisions on crypto-assets relies exclusively on the willingness of the losing party. But one DAO member does not have the power to dispose of the DAO's crypto-assets if the protocol does not allow for it. Only the community of members acting within the parameters of the code can trigger an action from the DAO. However, obtaining a decision from a large number of pseudonymous members scattered across the globe presents a challenge for the DAO when it comes to transferring crypto-assets in compliance with a court order. Since DAOs are censorship resistant entities that are created and exist autonomously from any central authority, state authorities cannot force an action upon the DAO. This leads to a significant risk of non-compliance with a court order because people know that coercive enforcement is not a realistic possibility.[95]

Since a state has no power to enforce a judgment rendered by its courts on the blockchain, the efficiency of justice cannot be guaranteed. However, it is true that a state court could order a compensation (such as the payment of damages) to circumvent the impossibility of enforcement on the blockchain. As long as the DAO members (or, at least, some of them) are individuals who can be identified, it is also possible to exert pressure on them to get voluntary enforcement of a court order. For instance, when an individual declines to disclose the private key required to access the wallet containing the disputed crypto-asset, the court can issue an order compelling them to enable access to the crypto-asset, accompanied by the potential consequence of being held in contempt of court. Such an order can also be directed towards the custodian in cases where the disputed crypto-asset is held by a custodian. In addition, in the particular case where the DAO is attached to a legal entity through which it acts in the physical world, the authorities will of course be able to obtain enforcement of the court decision directly against the legal wrapper. But the enforceability of the court ruling on the DAO's crypto-assets hinges upon the nature of the relationship between the DAO and its legal wrapper. Furthermore, mechanisms can be put in place to ensure the execution of the court order, for example by means of an escrow agreement. Such mechanisms can also be used on the blockchain to hold in escrow crypto-assets, such as tokens or NFTs. With the exception of these cases, only a court order concerning physical assets – and not crypto-assets – can be enforced by force if a DAO does not spontaneously comply with the order issued against it.

5. Service of process to a DAO

The bZx DAO case[96] is a good illustration of the troubles encountered when bringing a DAO before a state court. However, a plaintiff initiating legal proceedings against a DAO will face additional problems, particularly regarding the service of court documents. In this regard, DAOs present an opportunity to explore novel and innovative methods of serving procedural documents.

In the U.S., the Commodity Futures Trading Commission (CFTC) served Ooki DAO – which is the successor of bZx DAO – by posting summons documents on Ooki DAO's online discussion forum and by submitting them via Ooki DAO's help chat box available on its website. The CFTC argued that it had

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[94] See *e.g.*, Wright (n 3): "Current DAOs that rely on participatory voting also often require a formal vote to determine if and when funds are deployed for a particular purpose. No single DAO member or other individual has the unilateral ability to transfer funds or defraud the organization of collected assets, unless they are the sole member participating in the decision-making process."

[95] See Henry H. Perritt, "Towards a Hybrid Regulatory Scheme for the Internet" (2001) University of Chicago Legal Forum 215, 258; Marc Clément, "Smart Contracts and the Courts", in Larry A. DiMatteo, Michel Cannarsa and Cristina Poncibò (eds), The Cambridge Handbook of Smart Contracts, Blockchain Technology and Digital Platforms (Cambridge University Press 2020), 285-286; Orna Rabinovich-Einy and Ethan Katsh, "Blockchain and the Inevitability of Disputes: The Role for Online Dispute Resolution" (2019) 2 Journal of Dispute Resolution 47, 73.

[96] See *supra* 3.3.

served the procedural documents to Ooki DAO via the only avenue that the DAO itself made available for the public to contact it and that this means did in fact provide notice to Ooki DAO. In this administrative proceeding, Ooki DAO is qualified by the CFTC as an unincorporated association because it "function[s] under a common name under circumstances where fairness requires the group be recognized as a legal entity".[97] Under California law, an unincorporated association is considered a separate legal entity from its members. It has the capacity to be sued, which allowed plaintiffs to list Ooki DAO as a defendant.

In a recent decision, a California Court[98] ruled that the qualification of Ooki DAO as an unincorporated association in the CFTC proceedings was appropriate. It also ruled that Ooki DAO was properly served in that capacity, because service via its online discussion forum and its chat box gave "actual notice to the party being served" in accordance with constitutional due process requirements.[99] This is a new way of using electronic means for the service of the litigation documents to the addressee. Service by electronic means is authorized by law in California but was, until now, usually meant for the service by email. This is a practical solution to the logistical impediment of serving on all the DAO token holders individually. But the manner in which the court documents are served "to the DAO" depends on the way in which the DAO operates, because a service can only be valid if the defendant has been served in a manner and at a time that make it reasonably possible for them to arrange for their defense.[100]

In an English case, the High Court of England and Wales granted an order permitting the service of court documents via a non-fungible token (NFT) on the blockchain.[101] Like the California court in the Ooki DAO case, the English court granted the plaintiff the right to alternative service because of the unique circumstances of the case and the impracticability of serving through conventional means. In this proceeding, the plaintiff alleged theft of cryptocurrency that he deposited within two wallets of third parties. The service was achieved by air-dropping the NFT representing the court documents into the two wallets where the plaintiff alleged to have suffered the fraud. Service via a wallet address is an innovative approach that utilizes blockchain technology to serve litigation documents[102] to unidentified individuals and initiate legal proceedings.

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97 *CFTC v. Ooki DAO* (n 98), 12-13.

98 United States District Court, Northern District of California, order of 20 December 2022 in the ongoing *CFTC v. Ooki DAO* litigation (Case Number 3:22-cv-05416-WHO), available at <https://casetext.com/case/commodity-futures-trading-commn-v-ooki-dao-1> accessed 1 June 2023.

99 *CFTC v. Ooki DAO* (n 98), 16.

100 Otherwise, the decision on the merits would not be recognizable or enforceable abroad, notably in the country in which service took place. See *e.g.*, Article 7 para. 1 of the HCCH Convention on the Recognition and Enforcement of Foreign Judgments in Civil or Commercial Matters of 2 July 2019 (the "Judgments Convention"): "Recognition or enforcement may be refused if (a) the document which instituted the proceedings or an equivalent document, including a statement of the essential elements of the claim – (i) was not notified to the defendant in sufficient time and in such a way as to enable them to arrange for their defence, unless the defendant entered an appearance and presented their case without contesting notification in the court of origin, provided that the law of the State of origin permitted notification to be contested; or (ii) was notified to the defendant in the requested State in a manner that is incompatible with fundamental principles of the requested State concerning service of documents". An equivalent provision can be found in Article 34 para. 2 of the Lugano Convention.

101 High Court of England and Whales, *D'Aloia v. Persons Unknown, Binance Holding Ltd and others* (24 June 2022).

102 The use of blockchain technology for the service of documents that must be served abroad would be a major improvement in the operation of the HCCH Convention on the Service Abroad of Judicial and Extrajudicial Documents in Civil or Commercial Matters of 15 November 1965 (the "Service Convention"). See Florence Guillaume and Sven Riva, "Launching the HCCH Service Convention into the Crypto Space", in Hague Conference on Private International Law (HCCH) (ed.), The HCCH Service Convention in the Era of Electronic and Information Technology (HCCH, 2019), 47.

In common law states, service is of particular importance because personal jurisdiction depends on the ability to service the claim form.[103] While the legal scope of this procedural step varies across jurisdictions, it remains crucial for initiating legal proceedings in all jurisdictions. The manner in which court documents are served on the parties depends on the procedural rules of the forum. Courts are grappling with the growing challenge of serving process on defendants who can only be traced to an email address, a social networking site, a website, an online discussion forum, or a wallet address. This issue becomes especially prominent when dealing with unidentified defendants and makes it necessary to find alternative means of service by electronic means.

However, an additional practical difficulty arises when service of judicial documents must take place in another state. International service of documents in civil or commercial matters is subject to specific requirements.[104] In general, international service by electronic means is permissible only if the law of the addressed state does not prohibit such service.[105] Due to the fact that electronic service is only permitted in certain jurisdictions[106], there may be instances where serving court documents on the defendant becomes impractical or unattainable. If an alternative electronic means of service is used internationally, which is not recognized as valid in the defendant's country, the notice will be deemed invalid. The issue of service of court documents can therefore be a real challenge when the defendant is a DAO or a pseudonymous blockchain user.

6. In search of alternatives to state justice

Considering the challenges involved in a judicial procedure, opting for a private justice system to resolve the dispute might offer a simpler and more efficient alternative to resorting to a state court. Among the Alternative Dispute Resolution (ADR) mechanisms offered by private justice, arbitration has long been the preferred option in cross-border business relationships. However, new modes of private justice that use technology to resolve the dispute have emerged, some of which take advantage of blockchain technology.

6.1 Arbitration

Arbitration is in principle linked to a state by the seat of arbitration. This way of resolving a civil or commercial dispute has the main advantage of issuing decisions that are binding on the parties and have a scope equivalent to that of a court decision when the procedure followed by the arbitrators is established or recognized by the states. Arbitral awards have thus in principle a *res judicata* effect and are considered as such equal to judgments rendered by state courts. Such decisions not only have

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[103] In UK, see *e.g.*, Trevor C. Hartley, International Commercial Litigation (3rd edn, London School of Economics and Political Science 2020), 133--165. In the U.S., see *e.g.*, Felix and Whitten (n 89), N 16, 42-48; *Burnham v. Superior Court of California*, 495 U.S. 604 (1990).

[104] See Service Convention (n 102), which is in force in 81 states. It should be noted, however, that this convention only applies when the document is to be transmitted to an addressee abroad (Article 1 para. 1), and does not apply when the address of the person to be served with the document is unknown (Article 1 para. 2). Where the defendant's address is unknown, it is not possible to determine whether the document is to be sent abroad, and the convention is therefore not applicable.

[105] See Article 5 para. 1 of the Service Convention (n 102): the document must be served in the addressed state "a) by a method prescribed by its internal law for the service of documents in domestic actions upon persons who are within its territory, or b) by a particular method requested by the applicant, unless such a method is incompatible with the law of the state addressed".

[106] See *e.g.*, Article 19 of the EU Regulation No 2020/1784 of the European Parliament and of the Council of 25.11.2020 on the service in the Member States of judicial and extrajudicial documents in civil or commercial matters ([2020] OJ L 405/40), which applies between Member States of the European Union. In Switzerland, electronic service of judicial documents (*e.g.*, by email) is not permitted. However, the parties may use a specific platform for submitting legal documents; in the case of electronic submission, the submission and its enclosures must bear a qualified electronic signature (Article 130 of the Swiss Civil Procedure Code of 19 December 2008; SR 272).

effect in the state of the seat of arbitration but may also have legal effect in other states. In a contracting state of the Convention on the Recognition and Enforcement of Foreign Arbitral Awards of 10 June 1958 (the "New York Convention"), recognition and enforcement of an arbitral award will be relatively easy to achieve. In other states, the conditions for recognition and enforcement provided for in the rules of private international law of the state where enforcement is requested must be fulfilled, just like the recognition and enforcement of foreign court decisions.

Arbitration may be a good alternative to state justice to resolve disputes involving DAOs. An arbitration clause can be incorporated into the code of a smart contract, just like a choice of court clause.[107] Arbitration offers several advantages over state courts, including the ability to assign dispute resolution to experts possessing specialized knowledge in the field of blockchain. Additionally, arbitration procedures are typically faster and, in certain instances, less costly than proceedings in state courts. Moreover, parties often enjoy greater flexibility in determining the rules that will govern their dispute before an arbitral tribunal.

Nonetheless, the same issues listed for state courts regarding the enforcement of the decision persist.[108] In order for an arbitration award to be effectively enforced, the parties must mutually agree to voluntarily execute the award, and the losing party must willingly comply with the award once it is rendered, as there is no external authority with enforcement powers over a DAO. Besides, the arbitration procedure may prove, in many cases, too cumbersome and costly for disputes arising from blockchain transactions.

6.2 Other modes of private justice

ADRs give access to a wide variety of opt-in private justice mechanisms that can be voluntarily chosen by the parties (*e.g.*, mediation, conciliation, neutral evaluation). These modes of private dispute resolution are increasingly present online, as part of mechanisms for resolving disputes that take advantage of technology. Recently, new types of ODRs have been implemented on the blockchain to use this technology for resolving disputes of blockchain users.

6.2.1 Online dispute resolution

The advent of e-commerce has led to the development of online dispute resolution (ODR) mechanisms, which are simpler, faster and cheaper dispute resolution models than state justice and arbitration.[109] However, while decisions made in the context of ODR proceedings may be legally binding in the same way as a contract, they usually do not have the effect of an enforceable court decision. They are not enforceable by state authorities in the same manner as decisions rendered by state courts, nor do they fall within the scope of the New York Convention. The execution of the outcome of ODR depends entirely on the willingness of the losing party. In the jurisdictions where non-execution of the outcome of ODR would equate to the non-execution of a contractual obligation, the party seeking execution will have to obtain a court decision which orders the other party to execute the performance due. However, it may be too costly to obtain such a court decision. When parties entrust the resolution of their dispute to an ODR mechanism, there is thus a significant risk that the decision is not spontaneously executed by the losing party who is well aware of the difficulties related to the execution of the outcome of ODR with the assistance of state authorities.[110]

It is worth mentioning that some e-commerce platforms enjoy a privileged position allowing them to have control over payments. This is the case, for instance, of eBay which has teamed up with

[107] See *supra* 2.2.2.
[108] See *supra* 4.
[109] See Guillaume and Riva (n 9), 33-37.
[110] See Guillaume and Riva (n 9), 32-33.

payment service providers to keep control over the payments.[111] When a buyer wishes to be refunded, the seller is encouraged to negotiate a solution, whether privately on eBay's platform or with the help of an external provider of negotiation services. In the event that negotiations prove fruitless and the payment was made using specific methods such as PayPal, the buyer can utilize eBay's internal ODR mechanism. Upon assessing the buyer's claim, eBay may decide to issue a refund and has the authority to enforce its decision using credit card chargebacks, occasionally without even consulting the seller. The combination of control over the payment method and the ODR mechanism produces an effective private enforcement mechanism. By enabling the self-enforcement of ODR decisions[112], eBay has successfully established a private justice system that serves as a genuine alternative to state justice.[113] Nonetheless, eBay's ODR mechanism relies on the assistance of an intermediary (such as PayPal) to enforce its decisions, indicating a lack of self-sufficiency. Furthermore, the ODR process is conducted exclusively by eBay itself, lacking the involvement of an independent third party with no vested financial interests. This could lead to a lack of impartiality in the dispute resolution.

6.2.2 Blockchain-based dispute resolution

Blockchain-based dispute resolution (BDR) mechanisms are conducted entirely on the blockchain and are configured in such a way that they can be performed using smart contracts.[114] This allows BDR mechanisms to avoid the main drawback of most ODR systems, which is the lack of coercive and independent means of enforcement. A BDR mechanism can indeed implement a direct and automatic decision enforcement mechanism by using a smart contract. Thanks to the use of this technology, the effectiveness of the dispute resolution process does not rely on the willingness of the parties to comply with the decision. It is therefore not surprising that BDRs are particularly interesting for the resolution of disputes involving a DAO.

As of today, there is one BDR that is operational for resolving disputes on the blockchain and is accessible to DAOs: Kleros.[115] This BDR mechanism was launched on the Ethereum blockchain in July 2018, has the particularity of relying on crowdsourcing in its dispute resolution process.[116] The characteristic feature of crowdsourcing is that the dispute is resolved by a jury composed of people who are not necessarily legally qualified, but who can take a stand on a dispute based on personal experience and technical qualifications.[117] The decision is therefore not based on a defined framework

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[111] See *e.g.*, Riikka Koulu, Law, Technology and Dispute Resolution – Privatisation of Coercion (Routledge 2019), 76-78; Zbynek Loebl, Designing Online Courts – The Future of Justice Is Open to All (Wolters Kluwer 2019), 4-7; Thomas Schultz, "eBay: un système juridique en formation?" (2005) 22 Revue du droit des technologies et de l'information 27.

[112] About the notion of self-enforcement in the meaning of enforcement by private authorities, see Thomas Schultz, "Online Arbitration: Binding or Non-Binding?" (ADROnline Monthly, November 2002), 4. See also Pietro Ortolani, "Self-Enforcing Online Dispute Resolution: Lessons from Bitcoin" (2016) 36 Oxford Journal of Legal Studies 595.

[113] Guillaume and Riva (n 9), 37. Same opinion: Loebl (n 111), 36-37 and 66; Pablo Cortés, "Online Dispute Resolution for Consumers – Online Dispute Resolution Methods for Settling Business to Consumer Conflicts", in Mohamed S. Abdel Wahab, Ethan Katsh and Daniel Rainey (eds), Online Dispute Resolution: Theory and Practice (eleven 2012), 150.

[114] See Guillaume and Riva (n 9), 37 et seq.

[115] See Guillaume and Riva (n 9), 44-50. Disputes related to the governance of a DAO may be resolved by Kleros. Aragon Court was not as successful as expected and no longer seems to be operational.

[116] See Clément Lesaege, William George and Federico Ast, "Kleros Yellow paper" (March 2020), available at <https://kleros.io/yellowpaper.pdf> accessed 1 June 2023.

[117] See Jaap van den Herik and Daniel Dimov, "Towards Crowdsourced Online Dispute Resolution", in S. Kierkegaard and P. Kierkegaard (eds), Law Across Nations: Governance, Policy and Statutes (International Association of IT Lawyers 2011), 244-257, available at <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1933392> accessed 1 June 2023. These authors call an ODR mechanism using crowdsourcing as a part of the dispute resolution process "Crowdsourced Online Dispute Resolution (CODR)". Other authors use the term "mob justice": Amy J. Schmitz and Colin Rule, "Online

of rules or precedent. Jurors vote *ex aequo et bono*, considering the arguments and evidence presented by each party, in favor of one of the options proposed by the parties for resolving the case. But in reaching their decision, each juror endeavors to anticipate the choices of the other jurors in order to align their vote accordingly. The main characteristic of the decision-making process is indeed that it is designed so that jurors have an economic incentive to make a decision by consensus.[118] Consequently, jurors receive remuneration solely if their vote aligns with the majority decision. Parties can appeal an indefinite number of times, each new appeal instance having twice the previous number of jurors plus one. When there are no more appeals, the decision is final and is directly and automatically enforced through a smart contract.

Entrusting the resolution of a dispute with a DAO to a BDR seems to be a good solution today, mainly because it avoids the difficulties associated with a procedure before a state court. For the time being, state courts cannot guarantee access to justice in a reliable manner for disputes involving DAOs. Connecting factors have a difficult time locating matters of company law that concern the governance of DAOs and other civil or commercial relationships to which DAOs are parties (*e.g.*, in contractual or tortious matters); it is hard (if not impossible) to identify the defendant when the parties involved benefit from pseudonymity in the blockchain environment; and the vast majority of DAOs do not have the capacity to be a party to the proceedings. Furthermore, even if a dispute involving a DAO can be brought before a state court, enforcement of the court decision on the blockchain is challenging when the losing party does not voluntarily comply. State enforcement authorities do not have the power to force a smart contract to execute in a certain way, nor can they freeze or seize crypto-assets from a DAO or an on-chain actor. BDRs allow litigants to circumvent these procedural difficulties by allowing direct and automatic enforcement of the decision as soon as it is final.

In comparison with state justice systems, the main drawback of BDRs is that they do not provide predictability as to the outcome of a dispute, especially when they do not refer to a defined framework of rules or principles to make a decision and when the dispute resolution system is not based on precedent either. The same situation can thus be solved differently depending on internal fairness considerations of each juror.[119] At the current stage of development, BDRs do not offer the same level of certainty as state courts, which adhere to legal rules and principles. Moreover, the decisions that can be obtained today through a BDR mechanism are, at best, binding in a similar manner to a contract. Like decisions rendered by other ODR mechanisms, they lack enforceability by state authorities to the same extent as decisions issued by state courts. They do not fall either within the scope of the New York Convention.[120] Due to the inability to enforce their decisions through off-chain mechanisms, BDRs are not ideally suited for resolving disputes involving physical property. For the time being, BDRs are predominantly effective in resolving disputes related to cryptocurrencies and other crypto-assets, as their decisions can be enforced directly on-chain through smart contracts.

Dispute Resolution for Smart Contracts" (2019) Journal of Dispute Resolution 103, 117; or "peer-to-peer arbitration": Michael Abramowicz, "Cryptocurrency-Based Law" (2016) 58 Arizona Law Review 359, 405.

[118] The main economic mechanism used is the Schelling Point (or focal point). The Schelling Point is, in game theory, a solution to which the participants in a game who cannot communicate with each other will tend to adopt because they think that this solution presents a characteristic which will make the other participants choose it too. Thomas C. Schelling, The Strategy of Conflict (2nd edn, Harvard University Press 1980), 57. See Yann Aouidef, Federico Ast and Bruno Deffains, "Decentralized Justice: A Comparative Analysis of Blockchain Online Dispute Resolution Projects" (2021) 4 Frontiers in Blockchain <https://www.frontiersin.org/articles/10.3389/fbloc.2021.564551/full> accessed 1 June 2023, 4; Facu Spagnuolo, "Crypto-economics considerations" (*GitHub*, 21 November 2019) <https://github.com/aragon/aragon-court/tree/v1.0.0/docs/3-cryptoeconomic-considerations> accessed 1 June 2023.

[119] Michael Buchwald, "Smart contract dispute resolution: the inescapable flaws of blockchain-based arbitration" (2020) 168 University of Pennsylvania Law Review 1369, 1407.

[120] See Guillaume and Riva (n 9), 58-62.

Nevertheless, BDRs have the merit of guaranteeing access to justice for DAOs that do not have legal personality. In any scenario where enforcement of the decision needs to occur on-chain, this alternative dispute resolution method proves to be a suitable approach. By taking advantage of the self-enforcement mechanism provided by smart contracts, BDRs offer a resolution of the dispute that can be executed directly and automatically, making it an effective means of dispute resolution. But it is also inevitable that some proceedings involving DAOs will end up in state courts, especially (but not only) in the context of proceedings involving state authorities. In this case, the members of a DAO without legal personality will be directly involved in the legal proceedings and may incur personal liability. This risk could be avoided if DAOs had a defined legal status.

Granting DAOs – maverick DAOs included – legal status would provide some legal certainty in the Web 3 environment, not only for the members of DAOs but also for third parties who enter into legal relationships with them. Due to the fact that DAOs are at the core of Web 3, it is crucial to provide a dispute resolution mechanism tailored to the characteristics of DAOs. This would help reduce the risk associated with engaging with a DAO and enhance trust in DeFi. The lack of effective access to state justice for DAOs undoubtedly hinders the development of Web 3, particularly in the realm of DeFi.