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Genesis and Legal Nature of Decentralized Autonomous Organizations: Personified Purpose and Algorithmic Will

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Abstract
The relevance of this article lies in the existence of over 13,000 decentralized autonomous organizations worldwide, with a total capitalization exceeding US $23 billion. Numerous projects exploit this form to circumvent regulatory frameworks. At both the international and Ukrainian levels, a coherent understanding of the phenomenon of decentralized autonomous organizations, their objectives, genesis, and legal nature remains absent. The purpose of this article is to explore the genesis and legal nature of decentralized autonomous organizations – from the inception of the technical idea to their transformation into sui generis legal entities. Applying comparative and formal legal methods to examine the development of the legal understanding of these organizations, and employing case study methodology to assess their implementation in practice, the article investigates the main stages of the formation of the modern concept of decentralized autonomous organizations, their differentiation from adjacent constructs – decentralized applications, autonomous agents, and decentralized organizations – by highlighting criteria of autonomy and decentralization, along with case studies from Bitcoin to The DAO. On the basis of a comparative legal analysis of regulatory models in the United States, Europe, and offshore jurisdictions, a conceptual mismatch is identified between classical corporate forms and the ontology of decentralized autonomous organizations. A two-component qualification test is proposed, alongside a typology dividing them into genuine, hybrid, and quasi forms. The findings of the study, together with the identification of practical challenges faced by such projects, substantiate the possibility of recognizing decentralized autonomous organizations as legal persons under Ukrainian law by means of the doctrinal construct of the "personalized purpose" (Zweckvermögen) developed by A. von Brinz, potentially implemented in the form of a foundation. This approach permits the integration of algorithmic will with legal personality without undermining their decentralized nature. The article provides a foundation for further inquiries into specific legal characteristics of decentralized autonomous organizations, including the "sorites paradox" and the prospects for legislative regulation within the Ukrainian legal order based on the doctrine of personalized purpose.

Keywords: *decentralized autonomous organization; foundation; blockchain; DAO; Web3.*

Генеза та правова природа децентралізованих автономних організацій: персоніфікована мета та алгоритмічна воля

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Анотація
Актуальність статті зумовлена існуванням понад 13000 децентралізованих автономних організацій у світі із загальною капіталізацією, що перевищує 23 млрд дол. США, значна кількість з яких зловживає такою формою задля обходу регуляторних обмежень. Як у міжнародному, так і в українському правовому просторі відсутнє усталене розуміння феномену децентралізованих автономних організацій, їх цілей, генези та правової природи. Метою статті є дослідження генези та правової природи децентралізованих автономних організацій: від зародження технічної ідеї до трансформації у правові утворення sui generis. Із застосуванням порівняльного та формально-юридичного методів для аналізу розвитку праворозуміння таких організацій, а також методу кейс-стаді для оцінки практичної імплементації відповідної організаційної форми, у статті досліджуються основні етапи формування сучасної концепції децентралізованих автономних організацій, їх відмежування від суміжних конструкцій – децентралізованих застосунків, автономних агентів та децентралізованих організацій – шляхом виокремлення критеріїв автономності й децентралізації, а також на прикладі кейс-стаді від Біткоїна до The DAO. На підставі порівняльно-правового аналізу нормативних моделей США, Європи та офшорних юрисдикцій встановлено концептуальну невідповідність між застосуванням класичних корпоративних форм та онтологією децентралізованих автономних організацій. Запропоновано двоскладовий тест кваліфікації децентралізованих автономних організацій та здійснено їх типологізацію на справжні, гібридні та квазіформи. Висновки дослідження, а також виявлені проблеми, з якими стикаються відповідні проєкти, обґрунтовують можливість надання правосуб'єктності децентралізованим автономним організаціям в українському праві через доктринальну конструкцію «персоніфікованої мети» (Zweckvermögen) А. фон Бринца, яка може бути реалізована у формі установи. Такий підхід дозволяє поєднати алгоритмічну волю з правосуб'єктністю без втрати децентралізованого характеру. Стаття закладає підґрунтя для подальшого вивчення окремих правових ознак децентралізованих автоном-

них організацій, зокрема і задля вирішення «парадокса нагромадження», а також для розробки законодавчих моделей регулювання таких організацій в українському правопорядку на ідеях доктрини персоніфікованої мети.

Ключові слова: *децентралізована автономна організація; установа; блокчейн; ДАО; Веб3.*

Introduction

The emergence of Web 3.0 (hereinafter – Web3), a decentralized form of the Internet, has brought about a paradigm shift in the perception of digital relations. Within this new framework, users were promised pseudonymity, the ability to independently own digital assets, and to manage their interactions without the intermediation of centralized platforms [1].

A key component of Web3 – alongside decentralized finance (DeFi), decentralized applications (DeApp), and others – is the decentralized autonomous organization (hereinafter – DAO): decentralized communities that operate on the blockchain and implement decisions based on pre-established rules [2]. The legal nature of such communities is unique (sui generis), as, by definition, they are associations of individuals formed to achieve a common purpose, yet they lack centralized governance and execute decisions without intermediaries.

The lack of understanding of the history, nature, and purpose of DAOs creates legal challenges, particularly regarding: 1) the definition of their legal status – whether a DAO is a sui generis phenomenon or a type of existing company; 2) legal liability – who bears responsibility in the event of violations of investors' or consumers' rights; 3) regulatory supervision – how states can regulate DAOs without distorting the original ideas of decentralization and autonomy by forcing DAOs to become ordinary companies [3; 4].

There is no unified approach to the understanding of DAOs in international legal systems, which complicates their transnational functioning. On the one hand, jurisdictions such as Switzerland, the Cayman Islands, the British Virgin Islands, etc., apply, mutatis mutandis, the provisions of corporate law to DAOs; on the other hand, jurisdictions including Wyoming (USA) and the Marshall Islands create lex specialis, recognizing DAOs as special forms of legal persons. However, these approaches prima facie do not align with the decentralized nature of DAOs, as they impose existing corporate requirements on a unique structure that exists outside centralized registries. Yet the absence of law enforcement practice also creates risks of abuse of DAOs for the purpose of evading licensing requirements, money laundering, and tax avoidance [5, p. 553].

Ukraine, which actively promotes a policy of digitalization and exports a significant volume of IT services, although possessing the potential to become a legal hub for the blockchain industry, does not regulate DAOs, thereby risking the loss of investments and facing the aforementioned instances of abuse retrospectively. Considering the experience of other countries, there still remains an opportunity to develop a lex ferenda that would not hinder innovation while ensuring legal certainty for business, investors, and the state.

The purpose of this study is to analyze the genesis of DAOs and decentralized organizations more broadly, to identify patterns in the development of these phenomena, scrutinize its legal nature and to examine whether there exists a necessity for the legal regulation of decentralized organizations in Ukraine.

Literature review

Although the history and legal qualification of DAOs, the most well-known form of decentralized collectives, have been relatively well studied internationally, this topic remains underexplored in Ukraine. Among the key international researchers are practitioners such as S. Larimer and V. Buterin, who have been shaping the modern understanding of DAOs and other decentralized collectives [6; 7]. Their works were the foundation for conceptualization of DAOs and their features, emphasizing their autonomous and decentralized governance structures with no necessity to regulate them. However, scientists as S. Hassan, P. de Filippi have contributed significant academic contribution into the technological, legal, and organizational dimensions of DAOs; they view DAOs as extraordinary organizations with internet governance and decentralized decision-making, focusing on the conflict between their autonomous nature and the need for regulation [8].

In Ukraine, most studies of DAOs appear in the economic field, while legal research is still limited. Some exceptions include the works of O. Kulyk, T. Hudima, and A. Soshnykov, who examine how DAOs fit into sanction policy and financial crime prevention [5, c. 553]. D. Allen and J. Potts study how technology and legal norms influence each other during the development of DAOs [1]. S. Sheikh and I. Sifat focus on how sustainable DAOs are, and argue that most of them are built for long-term operation, not fast growth. This has consequences for how they are governed and regulated [3].

In short, international researchers offer different views on DAOs and often combine legal and technological analysis. In contrast, Ukrainian legal scholarship is only starting to explore the topic. This shows the need

for more research that links law, technology, and economics to better understand how DAOs could work in Ukraine and beyond.

Materials and Methods

This research applies a combination of doctrinal legal analysis and technical study of DAOs to explore their legal nature and the extent to which they may be integrated into existing legal frameworks. The primary method used is comparative legal analysis on how jurisdictions grasp DAO concept and try to regulate this phenomenon. The study reviews corporate law doctrines, theories of legal personality, and the law of foundations. Particular attention is given to the German concept of Zweckvermögen (patrimony dedicated to a purpose), which allows for legal personality not in favor of a person, but of a designated objective. To understand the practical operation of DAOs, the study includes three case studies: Bitcoin, DashDAO, The DAO. Each case study focuses on key elements such as governance structure, decision-making mechanisms, level of decentralization. Based on the case studies and technical parameters, the research proposes a typology of DAOs using two main criteria: decentralization and operational autonomy. Historical method is used to understand the evolution of DAO concept.

The study is based on the following materials: legislative acts; court decisions, legal scholarship on organizational theory and digital law, industry reports and analytical reviews.

Research Limitations. The research is theoretical in nature. It does not include interviews or empirical surveys of DAO participants. The focus lies on legal construction and interpretation. Due to the rapid pace of technological and regulatory developments, some findings may become outdated. However, the study provides a foundational framework for future research and possible legislative action, particularly within the Ukrainian legal system.

Results and Discussion

The phenomenon of decentralized organizations is not new and traces its roots to the technology sector. Initially, the concept of DAOs was not associated with blockchain but with the Internet of Things. The term "decentralized autonomous organization" was proposed by Werner Dilger in 1997 to describe a distributed control system for a smart home – a network of autonomous agents in which actuators and sensors interact with each other in a decentralized manner, capable of self-adaptation and evolution, and resistant to external interference [9]. It is from this point that most researchers begin to trace the origins of DAOs [8].

It is likely that this idea was extrapolated to the modern concept of DAOs, which are likewise self-regulating and autonomous through the coordination

of nodes (a computer or server connected to a blockchain network and performing certain functions to support its operation) by smart contracts; they evolve via smart contracts throughout their existence and are resilient to external interference due to the distributed ledger among the nodes. Despite this hypothesis, the study of the genesis of DAOs should be grounded in the ideas of Web3 and the first successfully implemented project – Bitcoin.

The emergence of the modern concept of DAOs

Bitcoin is regarded not only as a successful project but also as the first DAO, since it is a distributed network that eliminates intermediaries, and so-called peer-to-peer electronic cash transactions are conducted autonomously according to pre-established immutable rules.

The main innovation of Bitcoin is the use of blockchain technology – a decentralized, immutable ledger secured by cryptography instead of trust in a central authority. The key ideas lie in the distribution of ledgers, where network nodes receive a copy of the transaction history and independently verify its authenticity [10, p. 1].

Bitcoin can be viewed as an organization (an association of people or social groups based on shared interests, goals, programs of action, etc.), whose participants are functionally divided into clients, nodes, and miners. Clients initiate transactions, nodes verify their compliance with established rules (consensus), and miners compute blocks based on the proof-of-work mechanism [10, p. 3]. Rewards are provided only to miners, as they ensure the operation of the network. Clients, in turn, may engage in speculative activities, earning from fluctuations in the Bitcoin exchange rate.

The next step in the development of DAOs occurred in 2011, when a discussion appeared on the forum bitcointalk.org, which initiated the theoretical development of an autonomous agent. A user under the nickname "julz" proposed the concept of software that could 1) provide services (e.g., data storage), 2) receive payment in bitcoins, 3) independently pay for hosting, and 4) replicate itself when profitable [11].

Bitcoin Core developer Gregory Maxwell expanded on this idea by citing the example of the "StorJ" system (decentralized file storage), where such an agent performs the function of a service operator. In this case, the program becomes an economic entity that autonomously enters into contracts, makes payments, orders services on freelance exchanges, and can even evolve through A/B testing mechanisms (marketing comparison of update conversion rates into agent popularity) and the integration of new modules [11].

From this point onward, there is a rethinking of distributed systems operating according to pre-coded rules without centralized management as a new organizational form of collective activity.

In 2013, Stan Larimer transferred the concept of autonomous software agents into the context of social and economic relations. He proposed considering cryptocurrency systems as a new form of corporate organization – a "distributed autonomous organization". In particular, Larimer reached the following conclusions:

a) Bitcoin (the organized system) is a distributed autonomous corporation, since Bitcoin (the cryptocurrency) can be viewed as a non-voting share that increases in value depending on the corporation's activity;
b) Bitcoin miners act as the corporation's workers, who receive compensation for their services and alone have voting rights regarding changes to the corporation's rules;
c) thus, Bitcoin is a "non-commercial crypto-corporation owned by shareholders and managed by workers" [6].

Characteristics of such "distributed autonomous corporations" include autonomy, distribution, transparency, confidentiality, fiduciary responsibility, self-regulation, immutability, and sovereignty [6].

An interesting aspect of this concept is the possibility of DAOs existing without legal personality due to ***autonomy*** *and* ***decentralization*** *– a fundamental distinction from traditional companies. Also notable is that the actual participants of DAOs are not token holders but only those who directly support the network and DAO activities – nodes, miners, validators, etc.*

Later, in 2014, Buterin developed the first classification of types of decentralized collectives, which outlines the transition from simple smart contracts to DAOs. This classification is based on three key criteria: (1) the degree of human involvement, (2) the level of system autonomy, and (3) the presence of internal digital capital (particularly in the form of tokens). It includes five types of systems that can be placed on a scale from the least to the most autonomous and self-sufficient digital entities:

1) The first type – smart contracts – is the simplest form of automated interaction. These are essentially sets of coded rules that are executed automatically upon the occurrence of a predefined condition, without the need for human intervention. Such contracts do not possess internal capital and do not create an organizational structure;
2) The second type – autonomous agents – are independent programs that function without human input, as described above by Gregory Maxwell. Autonomous agents do not form participant communities,

but they can operate with their own internal capital (e.g., paying for their own hosting);

3) The third type – decentralized applications (hereinafter – DeApp) – are programs such as BitTorrent or Tor. They operate without centralized control due to a system of distributed nodes, but do not make independent decisions, act according to a predefined program, and lack their own capital;
4) The fourth type – decentralized organizations (hereinafter – DO). "[...] a decentralized organization functions as a community of individuals, whose interactions occur in accordance with a protocol embedded in code and implemented via blockchain". Despite the adjective "decentralized", such an organization is seen as a transitional stage between traditional companies and DAOs. Decisions within a DO are made by humans through multi-signature mechanisms or voting on proposals in the network and are executed not automatically, but with human intervention;
5) The fifth type – DAOs – combine the presence of internal capital, usually in the form of tokens, with the minimization of human involvement in the decision-making process and the autonomous execution of such decisions. A DAO may engage external individuals (e.g., to perform certain tasks), but the key aspects of a DAOs existence – protocol updates, resource allocation, strategy changes – are carried out through algorithms embedded at the design stage. Thus, a DAO approximates a sui generis digital person, functioning independently of its founders and, in the future, of its participants. Buterin also considered Bitcoin and Larimers' BitShares as examples of the first DAOs and deemed it possible to create decentralized autonomous corporations capable of paying dividends [7].

This classification demonstrates important distinctions of DAOs, primarily from autonomous agents, DeApps, and DOs. In practice, these concepts are often conflated – both by regulators (most commonly, laws on DAOs equate DOs with DAOs and effectively regulate DOs) and by project founders, who attempt to use the term "DAO" in the hope of circumventing regulation.

A consistent step towards resolving disputes over the authenticity of DAOs is the application of a literal understanding of DAOs, rather than a reactive approach to quasi-DAOs. We propose the following syllogism:

a) since an autonomous agent is not an organization and exists independently, with minimal human intervention;
b) since a DeApp (1) is autonomous and decentralized on the technical level (as it operates through distributed node networks without a single centralized storage or server); (2) its users are merely

consumers of services and have no voting rights or influence over system changes or development; 3) a DeApp is dependent on developers, their decisions, and continuous updates;

c) since a DO (1) is a transitional form from traditional companies, being decentralized only through the existence of binding rules recorded in the protocol, and may depend on majority groups or executive bodies; (2) lacks autonomy, as decisions are made directly by people and their implementation requires human participation.

Then a DAO, in contrast, differs from autonomous agents, DOs, and DeApps both in terms of the level of autonomy and the nature of decentralization. Specifically, (1) unlike a DO, a DAO functions autonomously, since decisions are not only made but also implemented without human involvement thanks to smart contracts; (2) unlike autonomous agents and DeApps, in a DAO, users participate in making key decisions regarding the organization's development to achieve its goal. Moreover, the concept of decentralization is polysemous in the context of DAOs and carries deeper meaning than in DeApps: it refers not merely to the distribution of infrastructure across various nodes without a single data storage center (e.g., Tor), but to the absence of hierarchy specifically in the governance of the organization – the absence of centralized control and domination by majority participants. *As for autonomy, it may be argued that such autonomy in a DAO implies the absence of discretion in the implementation of decisions – all decisions become part of the DAO and are implemented into the protocol; in autonomous agents, such autonomy means complete independent existence and execution of decisions.*

Reasons for the deformation of DAO perception

One of the first projects that consciously employed the concept of DAO was DashDAO, established in 2014-2015, introducing a model of decentralized community governance with autonomous decision execution [12].

DashDAO is an example of a unique hybrid structure due to the inherent ambivalence of DAOs. The problem of DAO ambivalence lies in the decentralization dilemma – sufficient enough to exist outside regulated legal relations (e.g., Bitcoin), yet excessive for adequate participation in civil legal relations (e.g., Bitcoin cannot act as a participant in civil turnover). Therefore, DashDAO relies both on the DAO and on traditional legal entities [13].

DAO manifests itself: (1) in providing peer-to-peer electronic payment network services (like Bitcoin); (2) in the adoption of all decisions directly by DashDAO through masternodes, which are nodes holding a minimum of 1,000 DASH tokens and providing computational resources to support

the infrastructure (unlike Bitcoin, where miners have voting rights without threshold), and each masternode has a voting right on proposals [13].

Anyone can make a proposal: usually, proposals are discussed on the DashDAO forum, after which any token holder with 1 DASH may submit this proposal for voting by the masternodes. If approved, DashDAO allocates the budget necessary for implementing the proposal to the initiator or another team [14].

This article argues that the ability to make proposals and discuss them does not yet make an organization decentralized, as such ability is inherent in any legal entity that, for example, has a forum and a form for complaints and suggestions. In fact, a *decentralized organization is one where such proposals can not only be freely submitted but also brought to a vote or other collective decision-making mechanism without the possibility of being blocked or filtered by a centralized subject*. At the same time, the voting result must be automatically or algorithmically implemented in the organization's activity *without the need for additional approval or confirmation by governing bodies.*

Thus, true decentralization presupposes not only the right to propose but also a guarantee of objective consideration and direct implementation of decisions through pre-established mechanisms that eliminate centralized moderation or control.

Therefore, such a structure allows for a significant degree of decentralization of the project, as de facto the creators of DashDAO have no influence on the project, there is no ultimate beneficial owner, all masternodes are, according to Larimer, workers of this structure and receive up to 80% of the reward for resolved blocks and blockchain support [14]. DashDAO has no executive body; in the event of consensus on a proposal, DashDAO autonomously allocates a budget from the received 20% to the proposal initiators or third-party implementers. Token holders, in turn, receive services, including a peer-to-peer electronic payment system [14].

However, the voting threshold between regular nodes and masternodes may also indicate partial centralization of the project and should be assessed individually in accordance with the principle of substance over form. After all, holding 1,000 DASH is a relatively significant amount, which, in projects smaller than DashDAO, may potentially indicate centralized governance of a DAO. *Therefore, in the analysis, a quantitative criterion of participants and their ability to accumulate the threshold required for participation in decision-making must be taken into account.*

On the other hand, such a decentralized and autonomous structure does not allow for adequate participation in civil turnover, since there is no legal

subject participating in civil legal relations, and the participants of such DAO are not protected by limited liability, which is inherent to legal entities.

To resolve this issue, DashDAO has created a unique hybrid structure of DAO with traditional civil law instruments. In addition to the unincorporated DashDAO, the project includes the following:

1) Dash Core Group, Inc. – a legal entity registered in Delaware, which is used for hiring employees who work exclusively for the benefit of DashDAO, as well as for conducting operational activities on behalf of DashDAO where necessary [13];
2) The Dash DAO Irrevocable Trust – a trust agreement under New Zealand law. According to this agreement, the trustee manages Dash Core Group, Inc. for the benefit of the masternodes, who are the beneficiaries, owns 100% of the shares, has the right, under the instructions of the masternodes, to dismiss directors, etc., and manages intellectual property. The settlor of the trust, however—and importantly, not the beneficiary—is one of the founders of DashDAO, Ryan Taylor [13];
3) The Dash Investment Foundation – an institution registered in the Cayman Islands. Its main activity is investment: to invest in blockchain projects on behalf of DashDAO [13].

Both the establishment of trust agreements and the use of unique legal entities (such as Cayman Islands foundations, which can exist without members and allow for decentralization on a principle similar to trusts) are proper steps for eliminating the founders of a DAO from factual and effective control over such an organization, since in a DAO, unlike DeApp or DO, the founders cannot interfere in the DAOs activities after launch (e.g., Bitcoin).

Accordingly, the following conclusions can be drawn:

1) The existence of pure DAOs at this stage is possible and is confirmed by the projects Bitcoin and DashDAO (network), which provide peer-to-peer electronic payment services;
2) However, if such DAOs wish to participate in civil turnover, engage in investment legal relations, and develop the project beyond technical protocol modifications, such DAOs must implement a hybrid structure using traditional civil law instruments as mediators for achieving their goals (legal entities, civil-law agreements, etc.). The DashDAO project has demonstrated that even with the use of such mediators, it is possible to maintain decentralization principles, as, where algorithmic execution is possible, all decisions are made by masternodes and are executed automatically by DashDAO; where this is not possible, decisions are made by masternodes, implemented by

trustees, and carried out by the operating company or investment fund for the benefit of DashDAO [14];

3) However, a hybrid system does not allow for full autonomy of such organizations (although DashDAO is a DAO in providing peer-to-peer electronic payment services, at the same time it is not a DAO in carrying out investment activities due to the need for the Dash Investment Foundation structure). Therefore, despite the self-designation, such organizations as a whole will likely be classified as DOs according to V. Buterin than as DAOs [7].

A more well-known and notorious example of a DAO is the project "The DAO", created in 2016 on the Ethereum platform with the aim of decentralized investment management. Despite claims of decentralization and autonomy, in practice this self-proclaimed DAO consisted of the unincorporated organization The DAO and the company that created it, Slock.it, a German legal entity. The DAO is a good example of the consequences when a declared decentralized project does not use a hybrid DAO model [15].

The DAO was created by Slock.it with the intention of functioning as a for-profit entrepreneurial organization, which would issue its own crypto tokens, and using the proceeds from their sale, The DAO would invest in other crypto projects. Additionally, token holders had the right to trade tokens on secondary markets. However, after the token issuance and before the beginning of investment activity, The DAO was hacked due to a vulnerability in the code, resulting in the theft of one-third of the tokens, which, however, was restored through a de facto restitution by creating a fork/duplicate of the original project prior to the hack [15].

The founders of The DAO viewed the project as a crowdfunding contract. Token holders had the right to vote and receive rewards. The founder Christoph Jentzsch compared this to shares in traditional companies. Decentralization was achieved by allowing all investors in tokens to vote on the use of the organization's funds, on the investment into recipient projects, etc. Autonomy was achieved by the use of smart contracts in accordance with pre-established rules in the code [15].

This form of "DAO" is qualitatively different from the ideas of Larimer, Buterin, and the projects Bitcoin and DashDAO:

1) By the role of participants: participants of The DAO were equated by its founders to shareholders with voting and reward rights. In contrast, in a DAO according to Larimer, token holders rather resemble clients and workers (such as miners/transaction validators or masternodes), if they support the functioning of the network;

2) By the type of token: The DAO effectively issued an investment token. Meanwhile, BTC and DASH (tickers of the respective cryptocurrencies) function as means of payment;
3) Lastly, the regulator of the United States, the "U.S. Securities and Exchange Commission" (hereinafter – SEC), in its document "Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO" established that The DAO lacked features of decentralization, was in fact an unincorporated association, and had issued unregistered securities [15].

Despite its failure, The DAO revived interest in DAOs and led to the emergence of new projects such as "MakerDAO" (2017), "Uniswap" (2018), and others, which remain active to this day. *The DAO was in fact the first to go beyond providing peer-to-peer electronic payment system services, which had previously characterized DAOs, and made the first attempt to create entrepreneurial DAOs for participation in other (e.g., investment) legal relations, which had a direct impact on the modern distortion in the perception of DAOs.*

Regulators' response

The accumulation of $150 million under the management of The DAO, the pseudonymity promised by blockchain technology, and its operation in a regulated sphere without proper authorizations – all these factors attracted the attention of the U.S. regulator. The first official response that changed the perception of DAOs was the aforementioned SEC document, "Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act. of 1934: The DAO".

The SEC established that: (1) Slock.it developed The DAOs code, claimed that it was audited by a leading IT company, created The DAO website on which promotional materials addressed to an undefined circle of persons were published, and administered a forum on the website; (2) The DAO issued tokens guaranteeing the right to participate in the governance of the organization, the right to participate in the distribution of its profits, and which freely traded on secondary markets. Proposals for voting could be submitted by any users holding 1 DAO token and making a deposit; however, a condition for publication for voting was the approval of proposals by the organization's "Curators". As established by the SEC, these curators had unlimited rights to decide on the admission of any proposal and could unilaterally change the quorum, thus effectively filtering proposals at their discretion. Lastly, "The DAO" executed user orders concerning token sales [15].

The SEC concluded that The DAO effectively violated several regulatory regimes: (1) it conducted a public offering of securities without SEC

authorization; (2) it acted as an operator of an organized trading platform without a license [15].

Although tokens were a novel sui generis object, the analysis of legal relations must apply the broad philosophical principle of substance over form. Therefore, pursuant to Section 2(a)(1) of the Securities Act, the SEC determined that the sale of tokens by such a DAO constituted an investment contract satisfying the four-prong "Howey Test" according to the case W. J. Howey Co., 328 U.S. 293 (1946) [16].

1) This means that The DAO was, in fact, not decentralized but rather an unincorporated association of natural persons. DAO participants were not direct managers of the DAO but, under the Howey Test, acted as investors in the project, thus fulfilling the first criterion of the test – investment of money;
2) As the project itself stated in marketing materials, investors were promised returns on investments, satisfying the second criterion of a reasonable expectation of profits;
3) Moreover, such profits would originate from the managerial efforts of others, namely the efforts of the Slock.it company, its founders, and The DAO curators. The DAO lacked genuine decentralization: (a) participants had no control over the organization, as only proposals approved by the curators were admitted for voting, which itself was largely symbolic due to the curators' unilateral ability to modify the quorum; (b) The DAOs existence depended on its founders, who developed the platform, addressed the consequences of the hack, and conducted the platform's marketing; (c) participants lacked genuine awareness of the proposals, as these were formulated in an opaque manner and could not be meaningfully discussed; (d) the pseudonymity of the organization precluded participants from effectively coordinating their collective efforts, which indicated the presence of centralized management.

Thus, The DAO cannot be considered an example of a genuine DAO, since the project in fact functioned as an unincorporated association of persons that conducted an unregistered public offering of securities, performed the functions of an operator of a trading venue, and also carried out the functions of a collective investment scheme.

Analogous conclusions may be drawn with regard to subsequent projects that nominally position themselves as DAOs, but do not demonstrate the required level of decentralization. In particular, this concerns bZx DAO, Ooki DAO, LidoDAO [17-19].

It is likely that it was the case of "The DAO" that caused a deformed understanding of the essence and legal nature of DAOs, having set a trend

toward using this term as a veil to evade legal regulation. Indicative in this context is the decision of the U.S. Commodity Futures Trading Commission (CFTC) of June 9, 2023 in the case CFTC v. Ooki DAO, which expressly states: "This decision should serve as a warning to those who believe that they can circumvent the law by creating a DAO in order to shield themselves from law enforcement and, in the end, put the public at risk" [17].

Moreover, in the case of Sarcuni v. bZx DAO, which became the first judicial precedent concerning the qualification of a DAO within tort proceedings, the court concluded that bZx DAO, which was governed through BZRX governance tokens, may be recognized as a general partnership under the corporate law of the State of California. Under such circumstances, persons who held governance tokens during a defined period may be held jointly liable for the actions of the DAO as co-owners of a business operating for the purpose of profit [18].

The court emphasized that the formal refusal to register a legal entity (the so-called "legal wrapper") does not release the DAO and its participants from the effect of ordinary legal rules governing partnerships. In this regard, decentralization as such does not guarantee the absence of legal liability, especially where the governance structure enables token holders to exercise real control and influence over decision-making and asset management [18].

The development of the idea of liability of decentralized autonomous organization participants was continued in the court decision in Samuels v. Lido DAO (N.D. Cal., 2024). In this case, the court of first instance rejected the motion of certain defendants to dismiss the proceedings, having found the plaintiff's allegations sufficient to claim that Lido DAO constitutes a partnership under California law, and that certain major LDO token holders may be jointly and severally liable as general partners. The court applied the doctrine of "meaningful participation" – participation that has an actual impact on the functioning of the DAO, primarily through token-based voting mechanisms and influence on business decisions. This corresponds to Larimer's ideas about worker-managed enterprises (persons supporting the network – meaningful participation), rather than client's (mere token holders) [19].

It is worth noting that the court rejected the argument that a DAO cannot be subject to a lawsuit due to its programmatic nature. Instead, the court explicitly stated that a DAO is a form of organization that is "at least partially constructed with the aim of avoiding legal liability", and therefore requires particular attention to actual governance and participation in its operations [19].

Thus, when combined with the decisions in SEC v. DAO, CFTC v. Ooki DAO (as an unincorporated association), and Sarcuni v. bZx DAO (as a general partnership), the Samuels case forms the following logic: (1) in the absence of sufficient decentralization and autonomy, a DAO may be subject to the application of lex societatis; (2) liability may be imposed not on all token holders, but only on those who effectively manage the DAO; (3) the absence of formal registration (a legal wrapper) does not eliminate the legal subjectivity of a "DAO" if it participates in the regulated relationships and such DAO may be pierced to common partnerships.

Hence, the United States is the first jurisdiction to have developed mechanisms for piercing the veil of decentralization in quasi-DAOs, as well as for holding participants jointly and severally liable not only for violations of investor rights, but also for conducting regulated activities without appropriate licensing.

Legislative initiatives

A combination of factors, including the legal uncertainty regarding the status of DAOs, the scope of liability of their participants, the nature of internal governance, and the abuse of the "grey zone", has highlighted the need to regulate this sphere. However, the primary stimulus for lawmakers was, arguably, the need to increase investment attractiveness by establishing legal certainty.

In 2018, the State of Vermont became the first jurisdiction to introduce a special legal form – the blockchain-based limited liability company (hereinafter – BBLLC). To acquire BBLLC status, a legal entity must include in its operating agreement: (1) a description of its mission or purpose; (2) the degree of decentralization and the type of blockchain used (public or private); (3) decision-making procedures (including the procedure for submitting proposals and the voting subjects – managers or members); (4) mechanisms for responding to security breaches; (5) the procedure for acquiring membership; 6) the rights and obligations of the members [20].

This approach expands the scope of the concept of limited liability companies (hereinafter – LLC), rather than reducing the ideas of DAOs, in particular with regard to autonomy and decentralization. The BBLLC regime creates a legal framework for the legitimate functioning of DAOs under defined legal conditions.

In 2021, the State of Wyoming became the first jurisdiction in the world to adopt special legislation providing for the possibility of registering a DAO in the form of an LLC. The main elements of the legal regime include: (1) the mandatory presence of a registered agent within the State of Wyoming; (2) the requirement to include the designation "DAO", "LAO", or "DAO LLC"

in the legal name; (3) the possibility of DAO governance either by members or through algorithmic management via smart contract; (4) the inclusion of the smart contract into the charter; its modification requires corresponding amendments to the founding documents; (5) automatic dissolution of the DAO in the event of inactivity (no decisions or actions) for one calendar year; (6) no fiduciary duties of members by default (unless otherwise expressly provided in the founding documents); (7) the admissibility of using mutable smart contracts as governance instruments [20].

However, practice has shown that the before mentioned legislation has not achieved its intended goals. Instead of creating unique legal frameworks for DAOs, the law effectively transformed them into classical LLCs that merely use blockchain as a technical solution management tool.

In April 2022, Tennessee amended its existing Limited Liability Company Act to provide for the possibility of functioning of Decentralized Organizations (DO) within the existing corporate structure. The main elements of the legal regime include: (1) the DO is registered in the form of an LLC; (2) the law requires clearly established voting procedures and quorum – decisions may be made only with the presence of at least 50% of active participants; (3) both membership-based and algorithmic (smart contract) governance are permitted; (4) smart contracts may be an integral part of the organizational structure; (5) limited liability of participants [20].

Compared to Wyoming, Tennessee's legislation appears more flexible and pragmatic, as it regulates neutral DOs without attempting to reduce DAOs to a single corporate form.

For a complete overview, it is necessary to compare the evolution of the legal regime of decentralized autonomous organizations in the Republic of the Marshall Islands with Wyoming. In 2021, this jurisdiction was the first to mention DAOs within the framework of nonprofit organizations under the Non-Profit Entities Act §102(dd) [21]. This idea aligned with Dan Larimer's original concept, according to which DAOs are viewed as nonprofit crypto-corporations operating within shared ownership and collective governance (although he envisioned the possibility of profitable models).

However, on November 25, 2022, the Republic adopted a special Law on Decentralized Autonomous Organizations (DAO Act 2022), which departed from the initial concept and introduced the possibility of establishing DAOs as limited liability companies [22]. This was a reaction to competition for regulatory leadership among jurisdictions, particularly to Wyoming's model.

Paradoxically, already on January 7, 2024, by law № SF0050 on Unincorporated Nonprofit DAOs, Wyoming itself undertook a regulatory U-turn, recognizing the limitations of the DAO approach as LLCs [23].

Although on one hand, it provided the minimally necessary legal certainty (legal personality, limited liability, the ability to enter into contracts), on the other hand it created a serious collision between the centralized nature of LLC corporate governance and the decentralized mechanisms inherent to DAOs. Such an approach reduced DAOs to ordinary companies, which presupposes the presence of management bodies, fiduciary duties, and a potential profit-making purpose, which in the case of many DAOs is either unsuitable or directly contradicts their mission – ensuring openness, decentralization, accessibility, and immutability of the code.

Thus, the State of Wyoming introduced a fundamentally new legal construct – a decentralized unincorporated nonprofit association (hereinafter – DUNA).

DUNA is the world's first specialized form of an unincorporated nonprofit entity, designed ex ante specifically for decentralized organizations. This model is based on the following features: (1) nonprofit character – a DAO may engage in economic activity, but its revenues must be used to achieve the common purpose and not distributed among members (see Paras 17-32-104 of Law No. SF0050); (2) decentralized governance – decision-making participation is carried out through consensus algorithms, smart contracts, blockchain voting, etc. (see Paras 17-32-121–122); (3) limited liability – DUNA members bear no personal liability for the organization's actions (see Para 17-32-107), thus eliminating the risk of classifying the DAO as a partnership; (4) legal personality – DUNA can enter into contracts, hold property, appear as a party in legal proceedings, and pay taxes (see Paras 17-32-108, 17-32-110); (5) absence of mandatory centralized administration – a DAO may exist without managers, and administrative functions are delegated by participant decision (see Para 17-32-123); 6) possibility of participant remuneration – compensation for governance participation or services rendered is permitted (see Para 17-32-104(c)) [23].

Thus, the approaches of Vermont and Tennessee are conceptually balanced, as they create favorable conditions for the existence of companies utilizing blockchain in their activities and regulate decentralized organizations (DOs), which is important for legal certainty in blockchain-based corporate governance, legalizing the circulation of financial instruments in the form of tokens, and legitimizing reporting through distributed ledgers, among other things. However, Wyoming's regulatory U-turn may foster a favorable environment for hybrid DAOs. In such a case, it is necessary to distinguish the project as a whole (for example, Dash), which unites both DAO and DO, namely services that constitute the substance of investment, civil, and other legal relations (The Dash Investment Foundation) and require legal structuring for participation therein, from the DAO itself (DashDAO as a peer-to-peer payment service).

Is There a need for DAO regulations?

S. Gassan and De P. Filippi emphasize the legal incompatibility of DAOs with legislative regulation: "The autonomous nature of DAOs is incompatible with the concept of legal personality, since legal personality can only be established where one or more identified persons are responsible for the actions of a certain organization" [8].

Most laws regulating DAOs are rather aimed at DOs than DAOs themselves, since DAOs, due to their decentralization and autonomy, as a general rule, do not create legal relations because of the absence of their elements.

Supporting this, in its consultation papers, Para 60, the European Securities and Markets Authority (hereinafter – ESMA) recognizes the idea that in truly decentralized organizations the stakeholders are validators of nodes, miners, and other persons (ESMA also provides examples of investors and protocol treasuries as stakeholders) [24]. Furthermore, in Para 108, ESMA reiterates Para 22 of the preamble to the EU Regulation 2023/1114 on Markets in Crypto-Assets (hereinafter – MiCA), stating that "where crypto-asset services are provided in a fully decentralized manner without any intermediary, such services fall outside the scope of MiCA" [24].

Thus, ESMA excludes DAOs from regulatory frameworks and establishes a **two-part test for them**: 1) the impossibility of identifying a specific service provider – decentralization, and 2) the absence of intermediaries – autonomy, which are, among other things, characteristics of DAOs.

However, contrary to such an "originalist" approach, proponents of a dynamic understanding of DAOs began adapting the DAO concept to practical realities. Thus, D.M. Grant, E.M. Kirby, and S. Hawkins note that DAOs may be different, such as algorithmic and participant-based. Accordingly, algorithmic DAOs do not require legal personality and are true DAOs existing on the blockchain; whereas participant-based DAOs (with a commercial nature and mutable smart contracts) require legal personality [25].

Nevertheless, from a theoretical perspective, it is difficult to agree with conclusions regarding the existence of participant-based DAOs, since the very name contradicts their characteristics. In such structures, it is difficult to maintain the features of decentralized governance and autonomy in decision-making, which increasingly indicates a DO rather than a DAO.

Moreover, in practice, there arises the difficulty of resolving the sorites paradox: to what extent an organization can relinquish autonomy and decentralization while still remaining a DAO, yet simultaneously becoming obligated to register a legal entity.

Therefore, a more consistent and logically grounded approach is the taxonomy of "decentralized communities" as a general category, within which DOs, DAOs, and DAC's perform the role of distinct types of decentralized collectives depending on the criterion of the establishment of legal relations.

To determine the necessity of regulating specific decentralized communities, a two-part test of decentralization and autonomy should be applied; if at least one of these characteristics is absent, such an organization must be regulated.

Depending on the regulatory necessity, we propose to distinguish: (1) ***genuine DAOs*** *that meet the ESMA two-part test; (2)* ***hybrid DAOs*** *that implement DAO and DO elements for different parts of their services; (3)* ***quasi-DAOs*** *that do not satisfy the two-part test and do not have a genuine DAO component for the provision of certain services.*

Regulation of DAOs in Ukraine

Although the issue of decentralized organizations has had an impact in various countries, demand for them in Ukraine has remained low. Projects containing "DAO" in their name, such as Ukraine DAO, were quasi-DAOs [26]. The consequences of delays in researching and formulating regulatory views on decentralized collectives may result in abuses in capital markets by entities that merely formally declare compliance with the principles of decentralization and autonomy, unjustified investor expectations regarding collective decision-making by token holders, and a lack of legal certainty. Legal uncertainty creates obstacles to the formation of an attractive investment climate, encouraging capital outflow abroad.

At the same time, the absence of regulation in Ukraine may open opportunities for lex ferenda research, taking into account the experience of other countries. Ukraine certainly needs to regulate those decentralized collectives that truly require it: hybrid DAOs and DOs (quasi-DAOs), and other entities implementing blockchain to legitimize reporting, issuance of financial instruments in the form of cryptocurrency, and so forth.

However, Ukraine, as a country of the Romano-Germanic legal system, has the potential to lead the competition for regulatory leadership among jurisdictions by genuinely granting legal personality to true DAOs in accordance with the theory of the origin of legal entities as "personalized purpose" – Zweckvermögen of Alois von Brinz [27, pp. 453-456].

The Civil Code of Ukraine already contains the legal construction of a foundation, which, pursuant to Part 3 of Art. 83 of the Civil Code of Ukraine (hereinafter – CCU), is an organization created by one or several

persons (founders) who do not participate in its management, by pooling (allocating) their property to achieve a purpose defined by the founders, at the expense of such property [28]. Such an approach, firstly, removes the founder's influence over the subsequent activities of the foundation, which is important to ensure the full decentralization characteristic of DAOs, and secondly, creates the possibility to achieve autonomy by delegating binding instructions to the foundation's managers through the protocol itself.

As noted by I.P. Zhygalkin, one of the theoretical models explaining the nature of a foundation is the concept of the "personalized purpose" (theory of purposive or subjectless property), developed by Alois von Brinz. "He arrived at the conclusion that it is inappropriate to search for a human substrate in a legal entity, since in certain cases, law may exist without a subject, and property may belong not to the persons who created the corporation, but to the purpose pursued by the legal entity. Hence, the latter is a continuing state of property management, separated from all other property of the founders – that is, the property itself is this personalized purpose" [29, p. 11].

It is also important that, unlike associations, a foundation does not provide for membership. Participants in a DAO, likewise, do not enter into membership relations with the organization and do not acquire corporate rights (for example, the "workers" of a DAO as per Larimer). This aligns with the doctrinal understanding of a foundation as an organization acting in the interest of destinataries – an indeterminate group of persons for whose benefit the activity is directed.

Within the structure of a foundation, as rightly pointed out by I.P. Zhygalkin, "[...] there is no will-forming body, but there is necessarily a will-expressing (executive) body – the board, through which the will of the foundation is implemented, as the embodied expression of will of its founder(s)" [29, pp. 91-92].

In the case of a DAO, such a "will" will no longer derive from the founder, but will be formed by the decentralized community itself through consensus mechanisms implemented in the protocol. Smart contracts within the DAO will record the outcomes of voting procedures and, in essence, act as instruments expressing the organization's collective will. In this model, decentralization is achieved not only by removing the founders from management, but also by eliminating the human monopoly on will-formation: each node or validator in the system has an equal vote, and the board (as the DAOs body or delegated agent) is obliged to act strictly in accordance with the algorithmically fixed decision – the will of the DAO. Such a decision, being the result of collective "code as law", acquires an

imperative nature – the executive body merely implements it in the external legal environment, without discretion or veto power.

Thus, Ukrainian foundations, as regulated under the special Law of Ukraine "On Foundations" – according to the concept developed by I.P. Zhygalkin – have the potential to fundamentally rethink positivist conceptions of legal personality, bringing the legal order closer to the ontology of Web3. This entails a shift of focus from the subject as bearer of will to the personalized purpose, which is realized autonomously through smart contracts with possible delegation by the DAO of mandatory execution of decisions to the board. Within this vision, a DAO may acquire the status of a legal entity sui generis, which is not derivative of the will of a person or group of persons, but is an autonomous legal subject operating on the basis of transparent, immutable algorithms that reflect its purpose.

Conclusions

1. A definition of a decentralized autonomous organization is proposed, based on the concept of personalized purpose:

"A decentralized autonomous organization" is a digital form of property management organization operating on a public blockchain to achieve a specific, non-commercial purpose for the benefit of an indeterminate circle of destinataries. A DAO is established by founders without the right to exert further influence, possesses its own property, separated from that of the founders, and realizes its purposive will encoded in the protocol. This will may be specified by decisions adopted by participants (nodes, validators) through on-chain consensus mechanisms. The implementation of such decisions is carried out autonomously – without the discretion of any individual subject beyond the algorithmically determined procedure.

2. The genesis of DAOs should be analyzed through the prism of the formation of Web3, as it reveals the techno-social nature of DAOs, distinguishing them from classical associations based on personalized membership and corporate will. The developmental trajectory of ideas is as follows:

- 1997 – Werner Dilger first uses the term "decentralized autonomous organization" to describe a network of governance agents capable of adaptive interaction without centralized control;
- 2011 – the concept of a software agent is formulated, capable of providing services, receiving payment, independently sustaining its existence, and replicating itself;
- 2014–2015 – DashDAO implements a self-governance model with autonomous execution of decisions, while a hybrid model begins to emerge with the incorporation of classical legal structures for investment purposes;

- 2016 – The DAO (Slock.it) on Ethereum initiates mass adoption of the DAO concept, though it proves to be an organization with imagined decentralization and autonomy, engages in regulated legal relations without licenses, and is hacked, marking a starting point for legal reassessment of DAOs;
- 2017 – present – regulatory responses (SEC, CFTC), litigation involving quasi-DAOs, development of a two-pronged test for assessing DAO autonomy and decentralization, imposition of joint liability on significantly involved DAO participants, and distortion of the DAO concept through its conflation with associations in certain jurisdictions.

3. The article proposes a classification of DAOs based on the criteria of autonomy and decentralization:

- True DAOs satisfy both elements: decision-making is decentralized, execution is autonomous, recorded in the DAO protocol;
- Hybrid DAOs combine centralized (DO) and decentralized (true DAO) elements;
- Quasi-DAOs only imitate DAOs externally (in form), while actual management remains centralized (in substance).

4. As a technological phenomenon, a DAO does not require mandatory normative regulation, similarly to peer-to-peer electronic payment systems. However, when a DAO goes beyond the closed scope of the protocol – entering legally significant relations, due to the development of artificial intelligence and its future capacity to interact with the external world, make legally relevant decisions aligned with the purpose and decisions of the protocol, and implement them via smart contracts – a need arises for the legal formalization of DAOs. If Ukraine aspires to regulatory leadership, it is necessary to eliminate conflicts with classical concepts of legal personality in associations, which are tied to personal will.

5. The doctrinal model of purpose-based assets (Zweckvermögen), developed by A. Brinz, allows for a rethinking of the legal entity not as a subject embodying another's will, but as an autonomous person realizing a defined purpose. In this sense, a DAO appears as a sui generis legal subject that functions without personalized participants (pseudonymously), founders, or a corporate body, and is governed by an algorithmically formed and protocol-expressed "will" established at inception and operationalized through its activity.

6. In Ukrainian law, the organizational form closest in construction to a DAO is the foundation – a non-membership legal entity that does not provide for corporate governance, but has a board as its will-expressing body. Within a DAO, such a board may be the protocol itself, with

implementation responsibilities delegated to direct executors as agents, without discretionary powers.

7. The Law of Ukraine "On Foundations", subject to doctrinal reexamination, may become a basis for the innovative regulation of DAOs in national law. Instead of introducing a new legal form, it would suffice to adapt the existing construct of the foundation to meet DAO-specific needs, particularly by normatively recognizing algorithmic will as the source of the board's decisions.

Recommendations

The findings of the study confirm the necessity of revising established doctrinal approaches to legal personality in light of decentralized technological phenomena. In view of this, the following positions are to be considered as recommendations derived from the conducted research:

1. Normative approaches to the legal qualification of decentralized collectives in Ukraine must abandon the reductionist practice of equating DAOs with traditional corporate forms. Instead, it is appropriate to implement a taxonomy distinguishing between DOs, hybrid DAOs, and genuine DAOs based on the dual criteria of decentralization and autonomy, as proposed in the article.
2. For decentralized collectives that engage in legally relevant activity, a hybrid model should be utilized through the adaptation of existing civil law constructs – the legal form of the foundation, trusts, etc. Such a solution would keep the decentralized governance model and eliminate founders from attempt to centralize management.
3. Within the Romano-Germanic legal tradition, Ukraine holds doctrinal capacity to recognize DAOs as legal subjects sui generis by reexamination of the concept of the "personalized purpose" (Zweckvermögen) formulated by A. von Brinz. This construct enables the emergence of legal persons not as emanations of natural will, but as autonomous centers of algorithmic will oriented toward the achievement of a predefined goal.
4. Further academic inquiry should be concentrated on the elaboration of the legal theory of algorithmic will, the doctrinal delimitation of decentralized governance from participant-based discretion, and the resolution of the "sorites paradox" in the legal qualification of decentralized structures. These tasks are essential for the prevention of normative erosion through quasi-DAO formations and the establishment of coherent criteria for legal recognition.

These recommendations directed toward the development of civil law tradition coherent model which will be responsive to the ontological specificities of decentralized phenomenon.

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