

CODING THE GOVERNANCE: DIFFERENT MODELS OF
BLOCKCHAIN-BASED GOVERNANCE SYSTEMS

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ABSTRACT

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Open and collective governance formations are being developed through ongoing participation from often faceless but verified individuals who trust the trustless technology of decentralized verification over the Internet. This new technology called Distributed Ledger Technology, a.k.a. Blockchain, is subject to innovation and use for governance purposes that are increasing in scope and variance. Nevertheless, there is considerably little attention being paid to the proliferation of blockchain-based governance models and the technology of blockchain in general, from social and political science research. Thus, this study offers theoretical analyses on various and often contradictory designs of blockchain-based systems that are being adopted, on the one hand, by an increasing number of national and international institutes and global governance organizations, and, on the other hand, transcultural grassroots Internet communities and organizations. Design specifics of blockchain-based governance system-architectures in use implicate that different and often contradictory terms of ‘the political’ are being encoded into immutable and highly-secure digital ledger-keeping systems. This thesis selectively reads modern and contemporary political theory perspectives on ‘democracy’ and the concept of the ‘political’ to develop a conceptual framework for a

normative analysis on blockchain-based governance. This selection follows the research principles of affirmative and diffractive reading as offered by New Materialism which recognizes the constructive effect of research on its object. The practice will entail reading different perspectives on ‘the political’, ‘democracy’, and ‘justice’ through each other, selectively constructing a research apparatus to observe their interference through which the object of this study, blockchain, can be normatively understood.

ÖZ

YÖNETİŞİMİ KODLAMAK: BLOKZİNCİRİ TABANLI YÖNETİŞİM MODELLERİ

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Dağınık Defter Teknolojisi olarak da bilinen Blokzinciri teknolojisi, kapsamı ve çeşitliliği giderek artan yönetim amaçları için gittikçe daha çok kullanılmaktadır. Blokzinciri uygulamalarının ampirik örnekleri, yalnızca farklı sektörlerdeki operasyonların kapsamı açısından değil, aynı zamanda ortaya çıkardıkları farklı yönetim modelleri açısından da büyük bir çeşitlilik göstermektedir. Bu açıdan, kullanımda olan sistem mimarilerinin tasarım özellikleri incelendiğinde, 'siyasi' kavramının çok farklı ve çoğu zaman çelişkili bir halde yüksek güvenilir ve geri döndürülemez dijital defter tutma sistemlerine kodlandığı görülmektedir. Buna rağmen, blokzinciri tabanlı yönetim modellerinin yaygınlaşmasına, ve genel anlamda blokzinciri teknolojisine, sosyal ve siyaset bilimi araştırmalarından oldukça az ilgi gösterilmektedir. Bu nedenle bu çalışma, bir yandan giderek artan sayıda ulusal ve uluslararası enstitü ve küresel yönetim kuruluşları, diğer yandan da çok kültürlü ve merkezless internet toplulukları ve organizasyonları tarafından benimsenen blokzinciri tabanlı yönetim sistemlerinin tasarım ve kullanımları üzerine teorik analizler sunar. Bu doğrultuda normatif bir analiz için kavramsal bir çerçeve geliştirmek amacıyla 'demokrasi' ve 'siyasi' kavramlarına ilişkin

modern ve çağdaş siyaset teorisi perspektiflerini seçici bir şekilde okumaktadır. Bu seçim, Yeni Materyalizm tarafından önerilen ve herhangi bir araştırmanın kendi nesnesi üzerindeki yapıcı etkisini kabul eden olumlu ve kırılmalı okuma ilkelerini takip etmektedir. Bu ilkeler doğrultusundaki ilerleyen çalışma, 'siyasi', 'demokrasi' ve 'adalet' üzerine farklı bakış açılarını birbirleri üzerinden okuyarak, araştırmanın nesnesi olan blokzincirini gözlemlemek için yeni bir araştırma düzeneğini seçici bir şekilde inşa etmeyi amaçlar ve blokzinciri ağları için demokratik ve adil yönetim sistemleri oluşturmakta siyaset teorisinden ve sosyal bilim akademisyenlerinin katılımından yararlanabileceğini öne sürer.

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LIST OF ABBREVIATIONS

BTC: Bitcoin, the native cryptocurrency of the first blockchain

ETH: Ether, the native cryptocurrency of the Ethereum blockchain

ERDF: European Regional Development Fund

DAOs: Decentralized Autonomous Organizations

DApps: Decentralized Applications

DLT: Distributed Ledger Technology, a.k.a Blockchain

ICT: Information Communication Technology

UNHCR : United Nations High Commissioner for Refugees

UIA: Union of International Associations' (UIA)

WEB: World Wide Web

CHAPTER 1

INTRODUCTION

First introduced as the algorithmic system on which the now famous cryptocurrency Bitcoin runs, Blockchain has seen an increasing attention in the recent years as “a novel architecture to transact, maintain, and share data in a decentralized manner.” (Ziolkowski, Miscione, and Schwabe 2020, 316) Blockchain, the pioneer of Distributed Ledger Technologies (DLTs), is a digital ledger on which the information listed is entered by individual users and the authenticity and validity of the information is verified, not by a central authority or an intermediary, but by the user community itself (Aste, Tasca, and Di Matteo 2017). The technology assures the immutability of the historical data through an algorithm-based solution which makes the tampering with the data in the ledger highly improbable since “(t)ransactions are validated, executed, and recorded chronologically in an append-only and tamper resistant database, where they remain always available on the Internet around the clock for on-demand lookup and verification.” (Swartz 2018, 603) This, in turn, makes the traditional need to trust a third-party to be obsolete in keeping records and/or making transactions. Solving the age-long trust issue in regulatory practices, the no-third-party feature of Blockchain is what made Bitcoin a breakthrough and meant that “the long-awaited realization of an old “cypherpunk” dream of money that is free from the control of the state and other third parties, such as commercial banks”, has finally come true (Reijers, O’Brolcháin, and Haynes 2016, 134). Now out of the shadow of the cryptocurrency models it enables, Blockchain itself is seen as an unprecedented opportunity to deliver to the needs of transparency and accountability in a

decentralized yet networked governance model. One significant application of this technology is the issuing of smart contracts where predetermined agreements among parties or stakeholders are auto-implemented by the code once the predetermined tasks binding the parties have been fulfilled. Smart contract technology's developer Nick Szabo described it as a "meeting of the minds" without the authority of a center or third-party to intermediate relations (Szabo 1997). According to proponents, the technology to combine blockchain and smart contracts can be used to run countries (Reijers, O'Brolcháin, and Haynes 2016). This sentiment is shared by many social science scholars such as Sinclair Davidson et.al., who explained, relatively early on in 2016, that "what at first appears to be part of the ICT revolution is actually better understood as a revolution (or evolution) in institutions, organization and governance." (Davidson, De Filippi, and Potts 2016, 1) With the introduction of blockchain to previous cybernetics developments including the smart contracts, we are now in an age of the World Wide Web which is referred to as the Web 3.0 and considered by many to be the epitome of technological viability for all governance practices. As Blockchain's inventor(s) known by the pseudonym Satoshi Nakamoto explains this technology as that through which "[a]ny needed rules and incentives can be enforced" (Nakamoto, 2007), scholarly assessments recommend "the adoption of blockchain in the public sector [through] understanding the dynamics of blockchain governance." (Tan, Mahula, and Cromptvoets 2022, 1)

The sociotechnical imagery of good governance through automated processes empowered by computers is not new; the field of cybernetics began referring to automated systems back in 1980s, reflecting the post-WWII spirit of anti-liberalism and anti-humanism in a vision of society that can and should be engineered (Nabben 2021). Vitalik Buterin, who invented the crypto asset Ethereum used by many blockchain networks to auto-execute peer-to-peer contracts, claims to have invented the phrase Decentralized Autonomous Organization (Buterin 2014a), it had been used before in the field of cybernetics to refer to the idea of "software encoded institutions" that are

independent “from external force and the control of others, human involvement, and self-direction through intelligent machines that can make decisions and participate in labour in the organization.” (Nabben 2021, 4) Lawrence Lessig’s (1999) famous saying that ‘code is law’ concerns the implications of this vision in the digitized world where software “displaces law by codifying the rules, making them more efficient than they were just as rules.” (Lessig 2006, 135) Throughout 1980s, while the cybernetic vision of a software empowered “ideal of a stable society” (Tiqqun (Collective) 2020, 31) was increasingly being embedded in the code which “has a regulatory function like laws” (Ziolkowski, Miscione, and Schwabe 2020, 2). Although initially implied emancipation from external regulatory organs, Lessig argued that this ideal of a stable society was not a normative principle but a driving force behind what Adam Smith described as the ‘invisible hand’ of market forces (Lessig 1999). With close code structures taking over the openness and liberty of the Internet in the 1980s, Lessig explained that “how the code regulates, who the code writers are, and who controls the code writers” should now concern what “any practice of justice must focus in the age of cyberspace. The answers reveal how cyberspace is regulated. [...] Its regulation is its code, and its code is changing.” (Lessig 1999, 60). Web 2.0 is where we began to see this change as the architecture of the Web began to fall apart from the ideals of liberty and openness that brought it about, in effect of the ‘invisible hand’ over which the governments lacked regulation. In order to understand why the web 3.0 is considered to be revolutionary in institutions, organization and governance, and how the empirical uses of blockchain deviate from these normative analyses, Chapter 2 of this thesis will offer a brief genealogy of the Web, so that when we get to web 3.0 in the narrative, we will see how the principles of decentralization and collaborative governance upheld by the Web 3.0 proponents are innate to the culture of internet and the trajectory of its development in a collaborative fashion. This will help highlight that the web 3.0 is actually the realization of a long dream finally enabled by the

development of an algorithm that had been longed for in computer science research.

Blockchain and Smart Contracts are the infrastructural technologies of Web 3.0, which is considered as the successor of Web 1.0 and Web 2.0. Web 3.0 is commonly known for the principles of decentralization, openness, trustlessness, and peer-to-peer collaboration. The US Senate Joint Economic Committee had reported¹ in 2018 that “(g)overnment agencies at all levels should consider and examine new uses for this technology that could make the government more efficient in performing its functions.” Nevertheless, the existing governance theories are inadequate in explaining the new modes of governance enabled by the Blockchain technology in organization and decision-making processes (A. Zwitter and Hazenberg 2020). While the overall scholarly studies in the field is scarce, the political philosophy approach to Blockchain lags far behind organization and juridical studies. One of the very few examples of this research is a very recent study by Reinsberg who concedes that Blockchain promises a “‘fully-automated liberalism’—whereby individual actors and the autonomous contracts that these actors create would work to achieve common objectives. By affording individual actors the possibility to securely transact with each other without the need for central authorities, blockchain technology tends to empower traditionally underprivileged actors.” (Reinsberg 2021, 3) The empirical cases of blockchain use in governance, however, do not consolidate this normative analysis. Depending on the ‘design choices’ of the code that is executed by blockchain, blockchain systems may offer emancipatory and empowering systems of governance, as well as oppressive surveillance and management with an increasing technological efficiency and dependence (A. J. Zwitter, Schulz, and

¹ 2018 Congressional Joint Economic Report published on March 13, 2018. Reachable at https://www.jec.senate.gov/public/_cache/files/aaac3a69-e9fb-45b6-be9f-b1fd96dd738b/chapter-9-building-a-secure-future-one-blockchain-at-a-time.pdf - Retrieved on October 10th, 2022

Gstrein 2020). Design choices have political implications and generate various outcomes using this technology which immutably reserves and auto-executes the code and all the information that it stores in a highly secure network. In this regard, this study will concern these implications of different blockchain designs for individual users in terms of whether the choices implicate a participatory and collaborative culture, justice and equality for all users in the network concerned. The distributed ledger system, a.k.a Blockchain, was initially designed to incentivize consensus among users by algorithmically securing that any historical or operational change is agreed upon by at least 51% of all participants of the network before it is implemented (Nakamoto 2008). Called the ‘Nakamoto Consensus’ by computer scientists, this consensus mechanism distributes the work necessary for network security and maintenance to all stakeholders by making sure that they are better off participating than not thanks to the algorithm that incentivizes good behavior (Long 2019; Saad et al. 2021). This feature offered unprecedented security in communication networks by dissolving the need to trust a central/host authority, which previously had to be protected at all costs against cyber-attacks. Accordingly, due to the overwhelming advantages of blockchain over the traditional models with its cost-efficiency and security, there has been an increasing adoption of blockchain by national and international institutes worldwide (Casino, Dasaklis, and Patsakis 2019; Zarpala and Casino 2021) (Casino et.al. 2019, Zarpala & Casino 2020).

The empirical cases of blockchain application show a great variety not only in the scope of operations in different sectors, but also in the different governance models that they engender. This is primarily due to the more recent types of blockchain, such as the ‘permissioned blockchain’, through which the levels of decentralization, participation and transparency can be adjusted. In this newer model, also known as the ‘private’ blockchain, governance roles of the network are distributed only to a selected few who are pre-defined with ‘permissions’ to make or propose changes to the operation of which they are seen as the sole stakeholders. Although many explain these phrases to be oxymoron “because

the blockchain is a decentralized and public technology, but “permissioned” means centralized and “private” is non-public” (Konashevych 2019, 2), they are now commonly used for enterprise and business purposes, which require various amounts of centralization, security, identity, and role definition unlike the nonhierarchical architecture of the original blockchain that is now called ‘permissionless’ in comparison.

The design choice of 'permissioned blockchains' are now increasingly used by national and international institutes even though computer scientists have pointed out security vulnerabilities specific to permissioned blockchains especially when used for not-for-profit operations (Okada, Yamasaki, and Bracamonte 2017). Moreover, qualitative research from analytical philosophy pointed to the logical discrepancies in permissioned governance systems (Parra Moyano 2017), and analyses from political science emphasized the risks of an unequal distribution of power roles within governance systems operated by an immutable technology (Dupont 2017; Franke 2020; A. J. Zwitter, Schulz, and Gstrein 2020). Hence, in Chapter 3, the new protocol of ‘permissions’ will be studied in relation to the features of the underlying blockchain architecture which assures the immutability of an autonomously functioning computer-based governance system. An example of permissioned blockchain use in global governance is in human rights protection supplied by the United Nations High Commissioner for Refugees (UNHCR) which started using the technology in 2017 to resolve issues around refugees’ registration with the UNHCR and the managing of their identities within contexts of assistance and protection. To do this, in 2017, UNHCR partnered with the British-based biometrics company named IrisGuard, who encoded individuals’ biometric iris data as private keys to their stored data on the blockchain. This enabled a seamless process of aid delivery to individuals whose irises are scanned for identification. The UNHCR explains that the technology decreased financial costs associated with transaction fees and fraud protection by a 98%. However, because of the permissionless nature of their participation in the blockchain network, the individual refugees lack authority over the storage and use of their

own data and are not even permitted to opt out of the system. In such an application, the blockchain serves the function of rendering the identities of persons seeking assistance and protection merely as “refugees” within a manageable system over which not even the UNHCR but the company IrisGuard maintains sovereignty (Franke 2020). Chapter 3 offers formal analyses of ‘permissioned blockchains’ from computer sciences, analytical philosophy and political theory to problematize the empirical evidence from the Zataari Refugee Camp run by the UNHCR in Jordan to dwell on the political implications of “design choices” (A. Zwitter and Hazenberg 2021) used in blockchain systems which fail to uphold the promises of initial normative analyses offered on blockchain-based governance.

On the other hand, platforms are being developed to ease the development of blockchain-based networks, and both commercial and free-of-charge applications are now available to use this technology as a governance tool for any organizational practice.² One significant application of the Blockchain technology is the distributed hosting of ‘smart contracts’ which are used to automate the terms of predetermined agreements among parties or stakeholders of an operation. These terms are auto-implemented by the code once the predetermined tasks binding the parties have been fulfilled. As the US Senate reported in 2018, “(w)hile smart contracts might sound new, the concept is rooted in basic contract law. Usually the judicial system adjudicates contractual disputes and enforces terms, but it is also common to have another arbitration method, especially for international transactions. With smart contracts, a program enforces the contract built into the code.” (US Congress Joint Economic Committee 2018, 210) However, it is due to the invention of blockchain, which is itself a weak version of a smart contract protocol (Buterin

² Example platforms to build blockchain-based community governance formations, a.k.a., Decentralized Autonomous Organizations (DAOs), such as Aragon claim to enable to “(g)over better, together. [...] on open-source infrastructure with governance plugins.” (<https://aragon.org/> -Retrieved on October 10th, 2022)

2014b), the application cases of smart contracts have invaluablely changed. Thanks to the amalgamation of blockchain and smart contracts in Web 3.0 applications, there is a new form of digital organization structure, namely the Decentralized Autonomous Organization (DAO), which uphold the initial normative principles of the original code structure of Blockchain, such as democratization of digital sphere and the self-government of individuals who are incentivized to work for a shared goal (Bellavitis, Fisch, and Momtaz 2022; Krishnan 2020). This research will dwell on the phenomenon of DAOs and how algorithmic solutions to the processes of decision-making and implementation are actively being developed by members of DAOs from around the world who utilize the technology to collaborate on various issues spanning from climate activism to financial investment. The DAOs are growing in numbers, operating for a variety of for profit and not-for-profit causes, and they deploy an increasing number of governance designs that are collaboratively formed by the involved community. The self-execution of the terms agreed upon by these communities implies a future of autonomous governance of individuals without the need of state authority to ensure compliance to laws. There are now more than 150 different governance models in use by these digital organizations (Bellavitis, Fisch, and Momtaz 2022). Using the new Web 3.0 infrastructure, these groups of voluntary and incentivized individuals develop proposals, implement and try out different models, and establish autonomous governance structures which incorporate technological as well as theoretical solutions into empirical cases of organization.

This study hypothesizes that collaborative efforts of volunteers incentivized to form democratic and just governance systems for blockchain networks can benefit from political theory and the participation of social science scholars to understand the democracy-justice nexus and to come up with solutions that are technologically available for the first time in history. In political theory, democracy is commonly defined as power equality among members of the relevant population. The typical empirical translation of “democratic equality”,

however, is some shape or form of the majority rule which risks oppression of minorities and the transgression of the fundamental libertarian rights (Brighouse and Fleurbaey 2010). The theory of democracy has concerned the most appropriate form of democratic equality since the times of the Ancient Greek thought, and the normativity of the one-person-one-vote structure with empirical cases of its leading to majority rule has since been questioned. In this sense, political theory has “frequently assumed that there is a tension between democracy and justice.” (Brighouse and Fleurbaey 2010, 137) This study offers qualitative research to demonstrate that blockchain-based DAOs present a singular phenomenon of collective effort to, both theoretically and empirically, investigate the most proper organization form in which to establish democratic governance. The study hypothesizes that, with participation informed with political theory from scholars and action researchers, DAO governance formations hold the potential to overcome the dichotomy between democracy and justice by designing and executing blockchain architectures where theories of democracy and justice are diffracted.

Diffraction, or interference, is a physical phenomenon that occurs when two different sets of waves encounter each other and, in their superimposition, reveal a pattern that does not otherwise occur. In physics, “diffraction apparatuses”³ have long been used by researchers to observe ‘interference patterns’ (Young 1801) which show complementary behaviors of matter that cannot be observed outside of their diffraction (Bohr 1996). This thesis argues for a diffractive inquiry on blockchain, not to investigate not what it inherently is or what has become of it in particular uses, but what can be brought forth through relating with this technology in a theoretically informed way. Thus, the thesis uses the ‘diffractive approach’ commonly used in new materialist research to enquire not what blockchain-based governance is, but rather what

³ The famous ‘double-slit’ first used in Thomas Young’s 1801 experiment is a ‘diffraction apparatus which reveals the behavior of light as both as particles and as waves.

blockchain-based governance may become through participation informed with political theory. The ‘diffractive approach’ was developed by the theoretical physicist and cultural studies scholar Karen Barad (2007) whose theory of ‘agential realism’ is itself a product of diffractive reading on Niels Bohr, Donna Haraway and Judith Butler. Agential realism builds upon Bohr’s concept of ‘apparatus’ as the measurement setting in which the act of observation influences the behavior of matter observed. Reading Bohr through Haraway’s (1988) insights on the situated nature of knowledge(s) and Butler’s (1993) understanding of bodies as performative of norms, Barad has theorized the entangled nature of ontology, epistemology and ethics and the need to overcome the subject-object dualism in research. New materialists employ the ‘diffractive reading method’ in qualitative research to form an encounter between different theoretical frameworks to examine their interference (Coole and Frost 2010, Geerts and van der Tuin 2016, Merten 2021 and others). They do this by reading theories through each other, not in a compare and contrast manner but by understanding one through the other in the context of the particular phenomenon being researched. To construct a new materialist diffractive research method in the context of blockchain-based governance systems, this study aims to read various modern and contemporary political philosophy approaches to democracy and what constitutes ‘the political’ through each other to form an interference pattern where alternative governance systems may manifest. In other words, it will read different discourses on concepts of political philosophy, such as ‘democracy’, ‘justice’, and ‘the political’, through one another, in a way that will selectively accommodate the affirmative analysis of blockchain-based governance. Doing so, the study aims to utilize together individually different discourses that are the “cohesive ensemble of ideas, concepts, and categorizations about a specific object that frame that object in a certain way and, therefore, delimit the possibilities for action in relation to it” (Epstein 2008, 2). Accordingly, the last chapter, Chapter 4, will dwell on theories of democracy and the conditions of ‘democracy’, ‘justice’ and the ‘political’ they envisioned to draft a road map

for developing blockchain-based governance models via questioning what design choices are available for democratic decision-making with tenets of open collaboration and active participation. Hence, the final chapter will explore, in a political theory perspective, the proliferation of new blockchain-based governance models both by DAOs and other formal state institutions and global governance organizations to reflect on the wide spectrum of the new digital terms that re-define the novel concepts of political philosophy.

New Materialism explains that research as a practice ‘matters’, in both senses of the term (Geerts and van der Tuin 2016). Accordingly, blockchain-based governance is a phenomenon that cannot be reduced to the contours of one theoretical framework for qualitative analysis, nor can it be identified with one empirical reality, such as the permissioned blockchains used in refugee camps. Hence, instead of committing to one theory as representational of the realm of blockchain-based governance, the study superimposes multiple theories which express different but complementary explanations for how blockchain may manifest different governance systems under different conditions of research and analysis. Moreover, it will analyze different uses of blockchain, and the significantly contradictory models of governance it enables, to explore different apparatuses in which blockchain responds to contextual particularities. Finally, by way of incorporating different approaches to what constitutes the ‘political’, what defines a democratic governance system, and what kindles our association with each other, the research aims contribute to the debates around blockchain-based governance through an affirmative analysis of technology itself, that is, the art of bringing forth a thing by actually relating to it, by looking at how it is diffracted by different political philosophies.

The final analysis of this thesis offers that individual rights, such as data privacy, are much less likely to be overridden when guarded by a permissionless blockchain system, than it is when kept by centrally operated systems. Using the blockchain, individuals are not required to trust the storage

of their data to central servers of corporations, much less reveal it to third parties for a network transaction. This is in line with the liberal belief that "the individual should be able to organize his/her life according to his/her own wishes, without unnecessary interventions." (Martin 2013, 106) Individuals self-identified with different group identities can become associated with a Decentralized Autonomous Organization without revealing unnecessary information or aligning with other group members on issues other than what they agree to in the particular smart contract. Moreover, as Shermin Voshmigr explains in the Trust in Blockchain Society documentary, in the context of blockchain-based governance, it is more explanatory to talk about blockchains rather than a single 'Blockchain' to comprehend its functionality for generating new political agencies. A new blockchain can easily be created among others which do not fully comprehend the cause which motivates the new creation. The significance of the new blockchain network rests only on its being created, not in terms of who participates in the network but in terms of what motivates its inception which cannot discriminate among its participants.

To dwell on the driving power of individual will that initiates a smart-contract in a blockchain network, the analysis starts with reading DAOs through the theory of social contract as offered by Jean-Jacques Rousseau. The technical aspects of blockchains and smart contracts utilized by DAO formations are examined in relation to the constitutive aspect of a collective will and the democratic methods for its construction. Later, with regard to the understanding of the smart contracts as 'the meeting of the minds' (Szabo 1997), the Kantian approach to 'reason' and its relation to what constitutes 'the political' is assessed. The analysis finds that, by following the processes Emmanuel Kant outlined to create the "sensus communis," DAO governance formations allow for network unanimity on 'the general will'. In this regard, to understand whether justice can be accommodated in an all-encompassing authority of the 'general will', the Kantian notion of 'sensus communis' is read through John Rawls' procedure of 'justice as fairness'. Rawls' understanding of justice entails the Kantian understanding of 'the mind' which is considered

to be universal to all human beings. It is found that the Rawlsian procedure can be accommodated in a DAO governance structure which allows for regeneration of the 'sensus communis' within the blockchain network where all participants agree to the terms of change, and, similarly in line with Rousseau's understanding of the 'general will', any member of the network who disagrees with a change in the smart contract cannot be a part of the collectivity that forms the DAO. Hence, radical democracy perspectives to what constitutes 'the political' are incorporated into the investigation of whether 'the mind' that is involved in a smart contract is formulated in terms of an exclusionary idea of a universal 'Self' that risks discrimination towards individuals as in 'permissioned blockchain' structures. Since, due to the structure of blockchain, a new network can be founded among members who generate and encode their own will that is generalizable only to the members of the new network, the blockchain technology is found to enable plurality through the creation of new subjects positions as advocated by authors like Chantal Mouffe and Ernesto Laclau. Hence, this novel research approach to blockchain unconventionally allows for radical democracy theories to coexist in a blockchain study with classical theories of social contract and contemporary understandings of the modern subject. With Mouffe in mind, it is possible that an irreversible digital ledger-keeping technology combined with autonomous "social contract(s)" that operate under the "veil of ignorance" might be harmful, depending on the design decisions included into the network governance structures. Nevertheless, DAO formations may be viewed as little autonomous organizations that might or might not be related or have subgroups. It is completely unpredictable how, why, and when a new organization will appear. Groups are created based on members' significant contributions to a cause that characterizes the DAO. When someone makes a contribution to the network, the smart contract will unquestionably carry out that person's activity inside the network, making it visible to everyone. If what is visible is the 'general will', the smart contract will execute it without human intervention. In this sense, to dwell on how being visible relates to the

conditions of public conduct, The final section of the thesis will explore Hannah Arendt's understanding of the 'political' and its condition as the 'appearance' of the human condition of plurality.

Overall, the research shows DAOs present a new and plural understanding of the public space where individuals' participation in the network concerns the 'political'. A new DAO can easily be created and be open to contribution, manifesting the existence of an opinion and its commonness to network's participants by being visible to everyone in cyberspace. "Any actor in the blockchain can submit a proposal that will be automatically executed if the consensus mechanism is triggered by the actors in the blockchain network. This ensures that all actors are voters and proposal-submitters at the same time: a clear case for networked power." (A. Zwitter and Hazenberg 2020, 8) Hence, instead of the institutional structure advocated by Mouffe to safeguard the equivalence between different struggles – 'conceptions of the good' -, we can design DAOs with smart contracts to pursue common ends, such as workers' interests, without risking, for example, fascism or sexism. Moreover, if such a contract fails to deliver in the eyes of one or more of its constituents, members may simply branch out to form a new chain with new terms of a contractual agreement collectively reached by all members. The reason for the new blockchain's creation may not comprehend the reason for the previous blockchain; however, the new reason must be valid for all the participants who helped create the new blockchain by agreeing on the proposal that acts as each group member's personal incentive to join the network. This is in line with how Rousseau explained the 'general will' as what is desired and/or needed by everyone regardless of the identity of the one who expressed it. In cyberspace where we can talk about the plurality of reason(s) for blockchain(s), those who do not agree on what is being proposed are never subjected to its rule. This analysis suggests that the 'reason' explained by Kant as the 'sensus communis' can be constructed by the blockchain technology, not in a unitary but rather in a plural form, being differentially performed by group members and realized in the formation of multiple governance structures. The open-ended

construction of smart contracts will allow for the proliferation of new public spaces and the collective formation of apparatus in which ‘actions’, in an Arendtian sense, can be witnessed.

CHAPTER 2

TECHNOLOGIES OF DECENTRALIZATION AND WEB 3.0

2.1 Internet, Web 1.0, and Web 2.0

Although the two words are used interchangeably, the Internet is not the Web. Internet is the physical wiring of computers, the first example being the connection of the mainframe computers of Advanced Research Projects Agency (ARPA) located in various government agencies, and education and research institutes in the US (Leiner et al. 1997). The defense department sponsoring the ARPA required that the network be decentralized by design for the concern that, in the context of the Cold War, if one or more computers were attacked the network would still remain functioning (ibid). The communication protocols necessitated for this procedure had already been developed by various scientists via their own initiatives in Europe and the US (Kirstein 1999). Once the first network was established using these open protocols, other networks connecting other computers were quickly formed, and the next logical question was how to connect these separate networks to each other, to have them inter-networking. This was accomplished, again by participation and collaboration of individuals and working groups around the world, by developing the communication protocols that could translate between the different networks that existed and, hence, had given us the network of networks that is called the Internet.

However, the use of the Internet, the retrieving of information from other computers in a network, was strictly reserved to the abilities of individuals with advanced computer skills. The Web is the protocol that solved this. In 1989,

Tim Berners Lee, a CERN engineer, published a document called the World Wide Web in which he described the necessary protocols for easily encoding documents to be published online, easily locating these documents on the internet through the Universal Resource Locators (URLs), and easily navigating between these documents through the use of hyperlinks (Berners-Lee 1998). These three protocol families have been essential to the functioning of the Web, and they are open protocols that had been published freely on the Internet for anyone to use, thereby making way for everyone with the right hardware to produce digital content themselves and to consume those produced by others. By the nature of being decentralized by design and governed by the open protocols developed by volunteers around the world, even in infancy, Internet was defined as a disruptive technology with potential to re-distribute the power embodied in traditional hierarchical institutes (Arquilla and Ronfeldt 2000). It was decentralized by design, and operated by open protocols developed by volunteers and working groups from around the world. The Web is one of these protocols, and it is itself a technology of decentralization which enabled, for the first time in Internet's history, the easy creation and sharing of resources online. Its creator Tim Berners Lee expected more from the Web from the very beginning, repeatedly expressing over the years his wish for a protocol where each computer connected to the Web could process all the data aggregated in the overall network. This vision he called, the Semantic Web (Berners-Lee, Hendler, and Lassila 2001). The vision of a Semantic Web is much more similar to the Web 3.0, first mentioned in an interview in 2014⁴, than it is to the Web 1.0 which Berners Lee could only develop using the then available 'server-client model' where resources are shared by server computers and received by client ones. These resources in the shape of websites were static – meaning that they offered the same information for all online visitors, unlike today's web pages with customized content and advertisements tweaked for our taste each and every time we visit them. The websites were also

⁴ Interview with Gavin Wood retrieved from <https://www.wired.com/story/web3-gavin-wood-interview/> on October 10th, 2022.

noninteractive, meaning that the content offered was produced and controlled by the website owner, and the Internet users could only receive it in a passive manner which we call today as the ‘read-only’ mode. This Web protocol is described as entailing “host-generated authority” over “host-generated content” (Korpala and Scott 2022), referring to the fact that the Web 1.0 allowed for total host sovereignty over any content production.

Starting in the early 2000s, we began to have interactive websites and social media platforms, such as Wikipedia, Youtube, or Facebook, which, instead of creating and serving content to users, enabled users themselves to produce the content that was offered back to them. This web protocol can be described as entailing “host-generated authority” over “user-generated content” to explain that it is still the hosts of these platforms regulating which content could be published and which could be consumed by whom. The centralization of the Internet began with the introduction of the new family of protocols referred here and generally as the Web 2.0, a.k.a the social/interactive web, where the codes developed for networking applications are not collaboratively developed by open participation but are closed to scrutiny and contribution from outside. ‘Host-generated authority’ over networks provided the code writers or their financial sponsors the means to develop protocols in favor of the advertisement-driven revenue model that is novel to the Web 2.0 applications of information and communication technologies. Today, we are aware that the price we pay for the free of charge applications of social media is the monetary value of our data, and that its being used out of our control limits and controls the habitus generated for us in cyberspace. What we are not fully aware of is that what the complex code structures running these platforms do with our data cannot be fully controlled even by the developers of the code themselves. A recently leaked document, an internal email from Facebook’s developer team to headquarters, explains why the government regulations regarding the use of user data cannot be implemented into Facebook’s core code. The developers plainly explain in the email internal to the firm their inability to cooperate with legal regulations for having already introduced into the code too many

protocols that work to streamline ad customization through data collection. The increasing amount of computer and human labor power needed for the upkeep and oversight of the code now overwhelms the ability of code's developers. They put it as follows:

We do not have an adequate level of control and explainability over how our systems use data, and thus we can't confidently make controlled policy changes or external commitments such as "we will not use X data for Y purpose." And yet, this is exactly what regulators expect us to do, increasing our risk of mistakes and misrepresentation.⁵

This is a solid example of the problems associated with the centralized nature of the web we use today, and the complex code structures of platforms which are, not only slipping from developers' control for including too many applications and protocols over time to enhance revenue over advertisements, but vulnerable against cyber threats by the nature of being centralized. The initial phase of Internet, which had known only 'open' code and protocols developed through participation by all willing and able individuals and groups, is referred to as the era of 'permissionless innovation' (Thiere 2014). The web protocols used in Web 2.0, however, are not open to anyone but the host authority, and the terms of its code regulate the user behavior of content creation and consumption in terms of revenue generation (Lessig 1999). Such perils of Web 2.0 are well known regarding the collection, analysis, and the mining of user data without their individual authority and, as apparent from the Facebook's internal email, increasingly without the authority of the code's own developers, their sponsors, or the governments who demand the implementation of regulations.

The complications regarding the close code structures of Web 2.0 increase by the means of artificial intelligence systems. For example, when used in credit

⁵ The leaked document was obtained by Vice Media Group and can be reached at <https://www.documentcloud.org/documents/21716382-facebook-data-lineage-internal-document>

assessment by centralized agencies, AI algorithms judge and score how credit-worthy individuals are by referring to the information they are trained with by developers. By inferring and administering upon the data available, these programs produce “a political choice ... basing their positions on the color of your skin, on the angle of the photo that was taken of you, or on the traces that are found on social media about you. A limited set that makes a very hard assessment on your future.” (Roio 2018) A recent study shows how the use of automated decision-making in financial risk assessment risks racialized and gendered outcomes for individual users not only because the system evaluates the unique identifying qualities and or past actions of individuals, but because the system is concerned more with the more generalizing data about groups of individuals concerning their tendencies and potentialities (Green and Chen 2019). The researchers show how the categorization of individuals through the data that somehow refers to poor income and potentially discreditable groups subjectivizes unique individuals to gendered and racialized regulations. These systems and the scores that they attribute to distinct individuals by referring to greater statistical data are generally flawed. As blockchain-based crypto asset Ethereum⁶'s inventor Vitalik Buterin and others put it in support of smart contracts as opposed to algorithm-based decision-making, the algorithms in place “opaquely overweight and underweight factors relevant to creditworthiness, and bias those who haven’t accumulated sufficient data – mainly minorities and the poor ... At worst, they can enable .. opaque “social credit” systems that engineer social outcomes and reinforce discriminations.” (Weyl, Ohlhaber, and Buterin 2022)

⁶ Buterin developed Ethereum as an open-source blockchain project which enables the decentralized supporting of smart contracts. Ether (ETH), the native cryptocurrency of the Ethereum blockchain has the second largest market capitalization after Bitcoin.

2.2 Byzantine Generals Problem, and Blockchain

Such perils of data storage and analysis by centralized networks has only bolstered the search for better technologies of decentralization, but it is not what birthed it. The protocol for the communication of sensitive information between multiple parties without trusting a center is an issue long attended by computer science research. It was first described in 1982 by Leslie Lamport and colleagues who put it in terms of a hypothetical problem named “the Byzantine Generals Problem” (Lamport, Shostak, and Pease 1982). The problem concerns a set of hypothetical Byzantine Generals and their troops surrounding a city that they want to siege. All in separate locations, the Generals must agree on the time of their next attack which will be successful only if it is conducted simultaneously. They have one messenger to send and receive messages with, but they are not sure whether or not there are any traitors among the Generals. Without a center to validate the authenticity of the votes, the individual Generals could not trust the information they received about other Generals, nor verify to others that their own votes are authentic. A solution was not yet available, and Lamport and his colleagues recommended that “an algorithm must guarantee [consensus] regardless of what the traitors do.” (Lamport, Shostak, and Pease 1982, 383)

To repeat it in daily terms, the Byzantine Generals Problem essentially asked how separate parties, located far from each other, could manage to take a collective decision, and trust their further actions on the consensus they reached. Blockchain is the answer to this problem. It enables the Byzantine Generals to securely communicate and keep a record of communications in a digital ledger which each willing General can locally store in real time in their own, hypothetical, computers. In the simplest terms, all transactions in a blockchain network are recorded on a chain of records which is divided into blocks. Each of these blocks own a unique identifying header which refers to

all the transactions that are included in the block, as well as the identifying header of the previous block on the chain. With each block referring to its preceding one, the trail of transactions can be traced back to the very first block. Because of the continuity this design offers, any change in the records would require the changing of all block headers following the one in which there is a change. This makes the records immutable and, since this chain is stored in real-time by multiple computers, the ledger is secure, the records are transparent, and the operations are accountable. Any change in records or operations must be agreed upon by the majority of Byzantine Generals to make sure that it is not initiated by a traitor among them. The Generals agree to the terms of change by storing the new version of the chain and recording the new transactions on top of it. Blockchain is essentially the algorithm that secures this consensus. It is a novel solution of organization and governance, also called the “consensus mechanism”, which renders the need for a third-party obsolete in record keeping and decision-making, offering unprecedented participation, security, transparency, autonomy, accountability and immutability in these processes (Lashkari and Musilek 2021).

The Byzantine Generals problem was solved in 2007, presented on a white paper signed by the pseudonym Satoshi Nakamoto, attached to an e-mail sent to the email group, cypherpunks, whose members included the Wikileaks founder, Julian Assange, imprisoned for alleged crimes against the United States of America for distributing sensitive state information. The group consisted of other activists against surveillance, among them many were cryptographers and software developers, who were brought together by the “desire for autonomy against the threat of corporate and state surveillance” and who “employed software engineering as a form of direct political action” (Nabben 2021, 4). The algorithmic solution for the Generals’ problem defined a formal game-theoretic model of network agency for each node/General to function for (crypto)economic incentives; i.e., Bitcoin, to form consensus in processes of storage, verification, and management of data traveling in the network. Rather than trusting a center or intermediary, or the information

traveling on the grapevine, users in a blockchain network trust the algorithm which assures that, for each user in the network, working with the majority of users is more beneficial than working against it. Trusting that the majority will tell the truth in the terms that benefit the individual the most, the algorithm assured that the individual Generals were incentivized to trust to and be trusted with the final decision that represents the consensus of the network.

First introduced as the algorithmic system on which the now famous cryptocurrency Bitcoin runs, Blockchain has seen an increasing attention in the recent years as “a novel architecture to transact, maintain, and share data in a decentralized manner.” (Ziolkowski, Miscione, and Schwabe 2020, 316) It is a digital distributed ledger on which the information listed is entered by individual users of a network and the authenticity and validity of the information is verified by the user community (Aste, Tasca, and Di Matteo 2017), while “(t)ransactions are validated, executed, and recorded chronologically in an append-only and tamper resistant database, where they remain always available on the Internet around the clock for on-demand lookup and verification.” (Swan and de Filippi 2017, 603) This technology assures the immutability of the historical data through an algorithm-based solution which makes the tampering with the data in the ledger highly improbable. This, in turn, makes the traditional need of an intermediary or third-party to be obsolete in keeping records and/or making transactions. However, as Robert Herian observed, “(w)hether viewed as a database, network or distributed ledger, blockchain is much more to its promoters and acolytes than mere code or a computational tool for time-stamping data records and transactions” (Herian 2018, 166). Innovation and experimentation in public sector using the Blockchain has been a challenge pursued by national and international organizations and the leading academic institutes around the world since the late 2010s. “From applications ranging from management of the electrical grid and utilities to how companies manage global supply chains, the potential for blockchain is truly revolutionary.” (US Congress Joint Economic Committee 2018, 214) Nevertheless, the overall scholarly studies in the field of

blockchain-based governance are scarce, and the political philosophy approach to Blockchain lags far behind organization and juridical studies while the existing governance theories are inadequate in explaining the new modes of governance enabled by the Blockchain technology in organization and decision-making processes (A. Zwitter and Hazenberg 2020). Notable examples of normative research on Blockchain is available by political scientist Bernhard Reinsberg, who conceded that Blockchain promises a “‘fully-automated liberalism’ – whereby individual actors and the autonomous contracts that these actors create would work to achieve common objectives. By affording individual actors the possibility to securely transact with each other without the need for central authorities, blockchain technology tends to empower traditionally underprivileged actors.” (Reinsberg 2021, 3) Also, early on in 2015, Wessel Reijers, Fiachra O’Brolcháin, and Paul Haynes explored “the way blockchain technologies can bring about and justify new models of governance” by way of analyzing the similarities and differences between models of government offered by social contract theories and blockchain technologies (Reijers, O’Brolcháin, and Haynes 2016, 134). As will be refuted in Chapter 4 of this thesis, the authors concluded that “blockchain reflects the idea expressed by Hobbes of a totalitarian sovereign in terms of rule-enforcement” (Reijers, O’Brolcháin, and Haynes 2016, 147).

In their 2017 review of the scholarship on blockchain, scholars Melanie Swan and Primavera de Filippi observed that the literature mostly referred to the restructuring potential of this technology for traditional systems of economic, legal and governance operations since “a variety of legal, financial, and governmental services could be reengineered and readjusted for the Internet era”, leading scholars to “see great benefit in articulating a philosophy of blockchain as a conceptual resource for understanding these progressions in our modern world.” (Swan and de Filippi 2017, 606) Nevertheless, while many researchers affirmed that human qualities of trust and truth can be formed through computational systems operationalized in Blockchain-based network societies (Velasco 2017), others were concerned that the cryptographic code

can “stand in” for individuals in a technological design that functions as an all-powerful “ordering-machine” (DuPont 2014, 8). Unlike Leviathan, the technological ‘ordering-machine’ could unfold a new level of authority and surveillance exceeding the bare collective power of a nondigital community, presenting new means for the provision and management of identities as subjects of governance. In a similar vein, Pablo R. Velasco pointed out how Frederick Engels (1978) had warned against the operational authority of the steam in the management of timed labour in the cotton mills, showing that the rules set for streamlining operations were set by workers, “but that once they are put into action, the machinery takes over, leaving no space for autonomy. The same can be applied to the human-made rules that design blockchains, which are surpassed once the system is operational.” (Velasco 2017, 723) To this end, scholars, such as Alan Cunningham (2016) and Golumbia (2015), respectively show how the resilience and immutability of a blockchain network may function to limit the leeway for individual political agency and constitute a particular political framework that is “profoundly antidemocratic” and serves “a neo-liberal agenda.” (Golumbia 2016, 128)

2.3 Web 3.0 and the Distributed Organization of the Internet

In terms of an internet protocol, the consensus mechanism finally enabled the ‘user-generated content’ to be regulated by ‘user-generated authority’, made the client/server model redundant, and presented a distributed organization and nonhierarchical administration of the network which is now referred to as the Web 3. Web 3.0 is a movement that uses a family of applications to replace an intermediary, like Facebook or Youtube, from regulating content creation and peer-to-peer communication online, and to form decentralized networks instead of central authorities to organize alternative regulations over systems such as to administer credit assignments. Blockchain, being one of the primary applications of Web 3, is a Cypherpunk solution to abolish central authority

and unchecked oversight in information and communication networks, and to open up the codes that regulate Internet users' behaviors to be developed, maintained, and regulated in terms of collectively taken decisions. Solving the age-long trust issue in regulatory practices, the no-third-party feature of Blockchain is what made Bitcoin a breakthrough and meant, as Wessel Reijers and others put it, "the long-awaited realization of an old "cypherpunk" dream of money that is free from the control of the state and other third parties, such as commercial banks." (Reijers, O'Brolcháin, and Haynes 2016, 134) Blockchain is now out of the shadow of the cryptocurrency models it enables and itself offers an unprecedented opportunity to deliver to the needs of transparency and accountability in a decentralized yet networked governance model. It has been described as a 'trust machine' (Beck 2018; Tseng et al. 2018) as well as that which generates 'trustlessness' (Forman et al. 2019) for the algorithm could be trusted to incentivize cooperation without a party to trust to. A more comprehending definition for the operative of 'consensus mechanism' could be articulated as the 'distributed organization of trust' considering the developmental trajectory of Internet and its Web applications.

The distributed organization of the digital space is not a new phenomenon either (Dilger 1997). The initial development phase of the internet is an example of distributed organization where the early protocols were technical specifications created by individual developers, working groups, and non-profit organizations, relying on the alignment of interests in the internet community to gain adoption. As the very developer of the World Wide Web, Berners Lee, explained in 1998;

The whole spread of the Web happened not because of a decision and a mandate from any authority, but because a whole bunch of people across the Net picked it up and brought up Web clients and servers ... The actual explosion of creativity, and the coming into being of the Web was the result of thousands of individuals playing a small part. (Berners-Lee 1998)

Berners-Lee's vision of the Semantic Web was adopted by many groups and collectives of the Web, such as Wikipedia and Anonymous (hackers) (Bellavitis, Fisch, and Momtaz, 2022). Wikipedia is a good and early example of a Decentralized Organization, founded by Jimmy Wales and Larry Sanger in 2001 following other attempts, such as Nupedia, to build an online encyclopedia the content of which was created by volunteers. Nupedia was run by open-source code; however, entries in Nupedia still had to go through the bureaucratic process of peer-review, a problem which Larry Sanger alleviated by suggesting the use of 'Wiki' in an email sent to the users in 2001⁷. Wiki was an open-source software developed by Ward Cunningham in 1994 to enable coordination of collaboration on editing documents in a real-time context (Henderson 2003). By allowing volunteers to edit each other's content, Wikipedia, initially a side application of Nupedia, grew to make its predecessor obsolete by means of distributing the organization, not only of content generation but also of its validation. However, such initial applications were not fully decentralized due to the nature of Web 2.0 protocols they used. With the technologies of decentralization now available, such as Blockchain and Smart Contracts of the Web 3.0, the server-client dichotomy of content management is abolished, and the maintenance and distribution of information, as well as its verification, can be administered by the users without a central authority to oversee the operations.

Although the smart contract technology precedes blockchain, the invention of the distributed ledger initiated their execution "by the network on which the code that comprises the smart contract is hosted." (Wright 2021, 72) This is a Web 3.0 novelty enabled by the decentralized governance of the network by all participants. When used together with blockchain, smart contracts make a network programmable, meaning that they allow for autonomously functioning

⁷ The archived letter can be found at:
<https://web.archive.org/web/20030414014355/http://www.nupedia.com/pipermail/nupedia-1/2001-January/000676.html>

web applications to be executed by multiple computers. These smart contract applications that are run on a blockchain network are called the Decentralized Applications (DApps), and they are used by volunteers from all around the world, “experimenting wildly with new tools for human collaboration.” (Emmett 2019) Using these tools which we can generally refer to as Web 3.0, individuals can try out different organization structures as real stakeholders of a cause of shared concern, and self-analyze themselves collectively for efficiency that leads to empirical practices of streamlining their operations. Such groups are called Decentralized Autonomous Organizations, shortly DAOs, and they use smart contracts to store the terms and conditions of their operations which are predetermined by all involved parties in a collaborative and collective fashion. To change these terms requires various processes of decision making and implementation for which, algorithmic solutions and protocols are actively being developed by participation from all willing members, and designs are collectively executed by the involved communities without the authority and consent of anyone but theirs. Thus, on the other end of the spectrum from ‘permissioned blockchains’, we can observe the participatory innovation of alternative designs and organization structures enabled by blockchain and smart contract technologies in the governance structures of DAOs.

DAOs utilize DApps for a variety of purposes that are growing in number. Since can be used to store and transfer anything from pieces of data and valuable information , as well as financial documents; when combined with smart contracts, they can be used to store the terms of a binding agreement between multiple parties. ‘Smart contract’ is another technology developed to abolish third parties from transactions (Szabo 1997). It is a software program that validates whether the conditions of an agreement have been met. If so, the software auto-implements the terms it is encoded with, without human intervention. When used together, blockchains and smart contracts make a network programmable, meaning that they allow for autonomously functioning web applications to be executed by multiple computers. These decentralized

applications (DApps) supported by blockchain and smart contracts make the client-server model redundant, finally offering a nonhierarchical administration for the Web in its third phase. These autonomously functioning applications of the Web 3 serve as the new communicative base for collaboration online. Volunteers from all around the world organize and collaborate on various issues spanning from climate activism (ClimateDAO⁸, KlimaDAO⁹) to regenerative finance (Commonshood Project¹⁰), to gender equality (Surge Women¹¹) by using the DApps as different organization structures and/or practices of streamlining the operations of which they are the stakeholders.

Blockchain-based DAO governance structures offer the way “to mark in time certain decisions that are taken, the way they're taken” which, as Roio further explains in the documentary, is a real ‘human right’. Also, in an economical sense, with blockchain utilities of paperless, automated, and verifiable ledger keeping through a network that is accessible to all, “smart contracts dramatically reduce transaction costs because ... (they) define the rules of the game and govern the decision-making process” (Bellavitis, Fisch, and Momtaz 2022, 5). The cryptographically verifiable votes and automated public auditing

⁸A DAO of minority shareholders in companies “to influence a company’s board of directors and executive management actions” that go against their ideologies by “signaling support with own shares, sourcing opportunities by performing due diligence on active proposals.” (<https://www.climatedao.xyz/about>) Retrieved on 10/10/1987

⁹ A DAO with native currency named KLIMA to “(f)ight climate change and earn rewards with KLIMA, a digital currency backed by real carbon assets.” – (<https://www.klimadao.finance/>) Retrieved on 10/10/2022

¹⁰DAO making tools from this DAO “provides commons and associations with instruments to help finance themselves issuing tokens representing prepaid cards, crowdfunding, complementary currencies, and to share tools and infrastructures using tokens representing access rights.” (<https://www.ngi.eu/blockchainsforsocialgood/2019/12/20/commonshood/>) Retrieved on 10/09/2022

¹¹ “A female-led organization focused on securing women's place in Web3 ... by educating and onboarding women and newcomers to Web3.” (<https://www.surgewomen.io/>) Retrieved on 10/10/1987

processes diminish corruption in governance systems where “DAO members’ decisions are open for public audit by all members of the organization (and potentially even the public), helping to ensure that procedural rules for decision-making have been followed and decreasing potential risks related to miscalculated votes.” (Wright 2021, 160) The DAOs are growing in numbers, operating for a variety of for profit and not-for-profit causes, and they deploy an increasing number of governance designs that are collaboratively formed by the involved community. Unlike traditional organizations that are “driven by top-down, private and centralized decision-making, DAOs operate through public and distributed decision-making” (Bellavitis, Fisch, and Momtaz 2022, 3). Smart contracts allow individual contributors of a DAO to be entrusted with tokens that are digital entities “designed to provide their holders with the right to govern underlying software through a vote.” (Wright 2021, 172) The self-execution of the terms agreed upon by these communities implies a future of autonomous governance where “decisions are made by logic defined in code, executed by smart contracts” (Galia and Barba 2019, 407). In 2021, The Wyoming Secretary of State recognized the legal status of DAOs, becoming the first U.S. state to accept DAOs as legal entities. As offered by DeepDAO¹², an organization researching and compiling data from the DAO ecosystem, at the time of writing this thesis, there are now over 2253 DAOs with \$11.6B in assets under management and nearly 4 million members. There are more than 150 different governance models in use by these digital organizations (Cumming et al., 2022). DAOs uphold the initial Web 3.0 principles, aiming for the democratization of digital sphere, and enabling the self-government of individuals who turn into groups by incentivization to work for a shared goal – producing content and administering it in your own terms.

This phenomenon of DAO proliferation cannot accurately be described by what Lawrence Lessig (1999) called the “code is law” paradigm which

¹² Data offered by DAO analytics engine found at: <https://deepdao.io/organizations>

emphasized the irrelevance and impotence of humans in the auto-execution of law by the code itself. The ‘code is law’ perspective fails to notice that, depending on the design choices, the Web 3.0 also enable a dynamic participation of all willing individuals and groups in the making of the code that is the law, by imposing user-generated authority on user-generated content. The code is law approach also pronounces the danger of concentration of power in those who are in the position to write the code either by technical skills or means of incentive. However, empirical cases of DAO governance demonstrate that great attention is paid by users to avoid building hierarchical organizational schemes and encoding unequal capacity of users to change them. Some of these communities use a one-person-one vote structure, while others develop algorithms, such as the ‘quadratic voting’ that prevents dominance of those with capital or skills to buy votes over others in the organization (Lalley and Weyl 2018), or ‘conviction voting’ which primarily values not the number of votes on a proposal but the continuity of members’ preferences for proposals expressed by the longevity of the vote referring to how strong their conviction is (Axelsen et al. 2022). Another example is the use of ‘holographic consensus, which “enables people to make predictions about which proposals will pass, and rewards them for making accurate ones. In this way, high-quality proposals aligned with the purpose of the DAO are supposed to be selected and will require a simple majority vote instead of absolute majority.” (El Faqir, Arroyo, and Hassan 2021, 2) These governance structures have been evolving from the initial one-person-one-vote structure to include more than 150+ DAO governance models so far (Bellavitis, Fisch, and Momtaz 2022).

CHAPTER 3

MODELS OF BLOCKCHAIN-BASED GOVERNANCE SYSTEMS

3.1 Permissioned Blockchain Model

As Pablo R. Velasco put it, “[t]rust can’t be democratized, as it is provided not by the system itself but by the managers. Thus, techno-social assemblages based on trusted management and centralized control are inherent in pre-blockchain ledger technology.” (Velasco 2017, 716) Trustlessness feature of the distributed ledger rests on the recognition of a network’s node as an ‘incentivized agent’ who is self-motivated to trust no one and do the job herself, knowing that every incentivized agent in the network will act the same. Incentivized to trust no one and do the job themselves, and incentivized to do it honestly, Byzantine Generals could know that every incentivized agent in the network will act the same. From a governance perspective, this feature appeared as a singularity among other conventional models supported by trust on a third-party (Ziolkowski, Miscione, and Schwabe 2020). As such, initial analyses of blockchain affirmed it as a novel solution for governance with decentralized decision-making and transparent administration (Swan and de Filippi 2017; Zarpala and Casino 2021) and have even described it as a revolution in institutions, organization and governance (Davidson, De Filippi, and Potts 2016). Marking the abolishing of ‘trust’ and ‘centralized control’ in regulatory systems (Velasco 2017), blockchain was recognized as promising a normatively desirable ‘fully-automated liberalism’ to provide “high-powered incentives for enhanced cooperation” (Reinsberg 2021, 1), especially in the worldwide governance of human rights protection (Hughes 2017).

‘Trusted management’ and ‘centralized control’ are not only less secure than a decentralized trustless system, but they are also highly expensive to maintain in the face of cyber security risks. As Sinclair Davidson et.al. put it relatively early on in 2016, “what at first appears to be part of the ICT revolution is actually better understood as a revolution (or evolution) in institutions, organization and governance.” (Davidson, De Filippi, and Potts 2016, 1) The cryptographic function of keypairs distributed to all stakeholders in the operation enabled the collaborative governance of a network where (trans)actions should be instantly validated, immutably recorded, and transparently available to all. Accordingly, due to the overwhelming advantages of blockchain over the traditional models with its cost-efficiency and security, there has been an increasing adoption of blockchain by national and international institutes worldwide (Zarpala and Casino 2021). Nevertheless, it was the economic advantages that fostered the technology’s adoption by the private sector which made blockchain a mainstream application of information technologies. ‘Consensus mechanism’ functions by incentivizing consensus among users by algorithmically securing that any historical or operational change is agreed upon by at least 51% of all participants in the network (Nakamoto 2008). Called the ‘Nakamoto Consensus’ by computer scientists, this mechanism distributes the work necessary for network security and maintenance to all stakeholders by making sure that they are better off participating than not thanks to the algorithm that incentivizes good behavior (Long 2019; Saad et al. 2021). This feature offered unprecedented security in communication networks by dissolving the central/host authority, which previously had to be protected at all costs against cyber-attacks. As cyber-attacks have been a labor-intensive and highly expensive problem to fight against in commercial networks, private enterprises led the way in quickly adopting blockchain as an organization, management, and governance tool for national and transnational business operations (Rouhani, Pourheidari, and Deters 2018). Hence, although its first use as the substructure of a decentralized and distributed financial system with its unique

operating currency named Bitcoin has been gaining a significant and steady reputation, the underlying technology of Bitcoin has been proving a lot more affluent in its use for governance practices thanks to the ‘consensus mechanism’ that significantly dropped the financial costs associated with network security (Polge, Robert, and Le Traon 2021).

In their commercial operations, companies utilized the distributed ledger to change the way they store and regulate sensitive information of customers, such as their credit card information, diminishing the financial costs of defending a center that, previously, single-handedly hosted this information. However, in networks that needed to be used by the private companies in whose governance an open participation is strictly undesirable, the system required a new layer of protocol to be implemented on top of the original code structure of Nakamoto’s. Without this new layer of code over the Nakamoto Consensus, the credit card info could not have been accessed by cyber-attackers nor the private company itself, the user’s keypair to the public ledger that documents how and when the data is being used prevents it from being accessed and monetized by anyone in the network without permission from the owner, that is, the user-generated authority. Hence, by pre-assigning some users as ‘permissioned’ in network operation, private enterprises introduced the ‘private blockchains’, a.k.a. ‘permissioned blockchains’ as a new model of the distributed ledger where an open participation in governance is unwanted. Now, according to the categorization offered by the UK Government Office, distributed digital ledgers comprise models that are based on trust, and some of them may function in a ‘permissioned’ mode in which, “anyone can use [the ledger/network], but only trusted nodes can maintain” (Okada, Yamasaki, and Bracamonte 2017, 593–94)

Also, the pressure on governments to harness the fruits of digital technologies to work more efficiently in their operations has increased – especially under the Covid-19 crisis (Wright 2021) With the growing mistrust in the national and transnational governance authorities, blockchain technology has begun to

be considered as a mechanism to enhance trust in and legitimacy of authorities, while the “(l)ack of transparency, excessive bureaucracy, and even cases of corruption, have created a downward spiral of citizen trust in public administration” (Persson, Parker, and Widmalm 2017). The global grasp of informational capitalism subjectivizing individuals as citizens of the world has also shifted the academic interest on the concept of ‘sovereignty’ to its questioning rather than its legitimization (Volk 2019, 2). Hence, innovation and experimentation in public sector using blockchain is now a challenge pursued by national and international organizations and the leading academic institutes around the world. The new ‘permissioned blockchains’, which “anyone can use, but only *trusted* nodes can maintain” (Okada, Yamasaki, and Bracamonte 2017, 593–94), are now being rapidly implemented not only by private enterprises but also by national, international and global governance institutes worldwide (Pekdemir 2021). However, recent studies warn against immature applications of blockchains without a true reflection on the design choices that imply immutability in governance systems (A. J. Zwitter, Schulz, and Gstrein 2020), and computer scientific findings present security vulnerabilities specific to ‘permissioned’ blockchain models (Okada, Yamasaki, and Bracamonte 2017), compared to the original blockchain structure which is now referred to as ‘permissionless’ in comparison.

The original blockchain structured around ‘consensus mechanism’ empowered users by assigning them individual (cryptographic) keys to freely secure, access and share their data, such as medical, financial, educational and other records, in their own terms by trusting it to a shared network run by a collectivity who has no access to the information. On the contrary, the permissioned blockchains are known to redistribute the formerly non-hierarchically assigned governance roles of the network merely by introducing another layer of code over the original blockchain structure before initiating the network operation. For example, depending on the code design, the individual could have no access to their own information but could only share it with the network, and the network could be run by a small group within a

larger collectivity who distribute the governance roles among themselves and who *could* have access to your information. These users in the smaller group are pre-defined with ‘permissions’ and are referred to as the ‘trusted nodes’ of a network, and they constitute a new ‘host-authority’ over the content generated by a ‘permissionless’ majority of users in the network. Research into blockchain requires scrutinizing the political aspirations that motivates its use (Bogost 2017), and “(t)he shared interest of multiple formally independent actors ... and possible mechanisms to maintain their interests should be developed and studied, such as coordination, control, or incentivization mechanisms, but rather informal mechanisms like norms or trust” (Ziolkowski et.al. 2020, 15). Accordingly, IT researchers categorized one use-case of ‘permissioned public’ blockchains to have a particularly weak potential to uphold the promise of security offered by the original ‘permissionless’ one: “blockchains under authority non-market based” (Okada, Yamasaki, and Bracamonte 2017). According to this study, when used in networks run not-for-profit where an economic incentive to sidechain the overgrown authorities in the network is missing, the system is vulnerable, not only to the motives of a “consortium” of trusted nodes under whose authority the network is run, but also to a security issue regarding “the limited participation in consortium [which] can bring problems concerning the possibility of fraud by collusion between nodes —the Byzantine Generals problem.” (Okada, Yamasaki, and Bracamonte 2017, 595) Assigning permission to some nodes over others, then, brings not only the whole issue of ‘trust’ back into the center of politics of blockchain, but also risks the robustness and security of the system provided by the original ‘consensus mechanism’.

However, despite the research emphasizing the weaknesses of ‘permissioned’ blockchains, there is an increasing adoption of this model of blockchain by national and international institutes on a global level. As the number of its implementations have been growing, empirical research in the area of blockchain use from a governance perspective remains alarmingly scarce (Treiblmaier and Sillaber 2020; Ziolkowski, Miscione, and Schwabe 2020).

Lack of empirical research on blockchain use-cases adds to the risk of implementing permissioned blockchains for the security and robustness features promised by original ‘Nakamoto Consensus’ which, unlike the new versions, “has proved to be stable in practice since its inception” (Okada, Yamasaki, and Bracamonte 2017, 595). Accordingly, further normative and empirical research on ‘permissioned blockchains’ will be salient contributions to the intellectual debate on the disruptive potential of the technology with regard to its political ontology, which “is the embeddedness of authority through computer-made control of trust in an actively fluid environment. Particular meanings of control, trust, and authority are folded into the instrumental operation ... and recording of the distributed ledger.” (Velasco 2017, 723–24)

3.2 The Case of the UNHCR

A ‘permissioned’ blockchain design captures the economically advantageous and high security features of the original (permissionless) blockchain structure by defining a set of users to whom the system distributes the governance roles to fulfill, hence applying the ‘consensus mechanism’ only to a selected few in the network which “only trusted nodes can maintain” (Okada, Yamasaki, and Bracamonte 2017, 593–94). This model allows for the unequal distribution of governance roles through assigning permissions for only specific nodes for system administration, and hence, defies the decentralized and distributed governance provisos of blockchain’s original ‘consensus mechanism’ where all willing nodes may freely attend the administration of the network of participants. In an analytical philosophy approach, Jose Moyano conceptualized the original blockchain structure as a ‘sortal of sortals’ where a construct can be contained within other constructs and hence allows “to define a continuum of interrelated identities of entities within a distributed ledger.” (Parra Moyano 2017, 688) When looked for in ‘permissioned’ blockchains,

however, this characteristic is lost in the dilemma known in ‘closed sets’ in number theory where “they need a certain ex ante agreement between the participants of the ledger [blockchain] in order to inscribe the identities of the entities that form the ledger.” (Parra Moyano 2017, 695) On top of the security advantages of a bigger consensus among the network, then, permissioned blockchains invite concerns regarding the subjects of a governance system pre-agreed upon by an ‘ex-ante agreement’ on the part of permissioned nodes.

The United Nations High Commissioner for Refugees (UNHCR) deployed a permissioned blockchain in 2017 to resolve the issues around the registration of individuals fleeing the war in Syria without any papers and in an influx to the refugee camp in Zataari, Jordan. To do this, the UNHCR partnered with a British-based biometrics company named IrisGuard, who encodes individuals’ biometric iris data as private keys to their personal information stored on a permissioned blockchain. The individuals in the camp can now easily validate their identities and accounts with the UNHCR by the blink of an eye, and initiate transactions, such as payments or authorizations, without presenting paper documents. The management of identities escaping from the Syrian War had been one of the most demanding issues in refugee-response operations by the (UNHCR) since 2012 (Hijab 2019), and according to UNHCR’s newsbrief¹³, this practice enabled “a 98% reduction in transaction fees, and fewer cases of misappropriation of funds” in delivering to individuals who scan their eyes for identification. Mageed Yahia, the Country Director of the World Food Program (WFP) which is involved in the operation, explains the benefits of the technology in WFP’s news brief¹⁴ as follows:

¹³ UNHCR Global Refugee Forum Monthly News Brief found at: <https://www.unhcr.org/5cc3200a0.pdf>

¹⁴ “WFP Introduces Iris Scan Technology To Provide Food Assistance To Syrian Refugees In Zaatari” found at: <https://www.wfp.org/news/wfp-introduces-innovative-iris-scan-technology-provide-food-assistance-syrian-refu>

The iris scan payment system has been extremely successful, and we are thrilled that WFP and its partners are now able to serve Syrian refugees living in Jordan's largest camp through this innovative system. [...] Iris scan technology has reshaped the shopping experience for Syrian refugees in Jordan, making it easier and more secure for them, while also enhancing accountability.

However, German Newspaper Die Zeit had published as early as in 2017 the report¹⁵ of nonconsensual registration into the system by camp refugees who do not necessarily understand what data they reveal or even understand the language of the document that they signed. As Marwa Fatafta, MENA Policy Manager at Access Now, which is a nonprofit organization defending digital civil rights, explains in a press release¹⁶: “When you have no choice, you can't consent. ... WFP and UNHCR have willingly unleashed iris scan tech upon at-risk communities, and must, at a minimum, be aware of the potential consequences of their actions.” The potential consequences of blockchain use on refugees is amplified by the nature of biometrics technology, as Iris Guard founder Imad Malhas himself explained to Die Zeit that “,(a)nyone who has been scanned can be perfectly identified at the age of 100 on the basis of their biometric characteristics.” With the technical structure of the original blockchain on which the new permissions are encoded, the system now immutably records the biometric data as the identifier of ‘the refugee’ on which category the individual has no permission to administer. In other words, refugees who are encoded in a 'read-only' mode in system operation, are exempt from the governance roles distributed to ‘permissioned’ nodes, and hence, are unauthorized even to opt out of the network, let alone participate in network governance.

¹⁵ Die Zeit article can be found in English on UNHCR Blog at: https://www.unhcr.org/blogs/wp-content/uploads/sites/48/2018/01/article_1.pdf

¹⁶ “Iris scanning of refugees is disproportionate and dangerous — What’s happening behind IrisGuard’s closed doors?” found at: <https://www.accessnow.org/irisguard-refugees-jordan/>

Designing a blockchain architecture for global governance institutes “without developing solid ethics and human rights principles ... may drastically reshape the relationship between the individual and society in favor of total, immutable transparency, thus benefiting efforts of centralized control.” (A. J. Zwitter, Schulz, and Gstrein 2020, 13) In 1994, Nikolas Rose observed ‘the new ‘post-social’ technologies of governing conduct which are taking shape” and elaborated on “the subjects of government specified in new ways, in terms of an ethic of activity which establishes new divisions between those who are considered to be competent citizens and those whose are not.” (Rose 1996, 337) When used in contexts of global humanitarian governance, such as by the UNHCR, permissioned blockchains risk the identification of the new subjects of global governance through an ‘ex-ante agreement’ on the part of permissioned nodes. Hence, in a political theory perspective, the ‘ex-ante agreement’ among the ‘consortium’ encoded in technologies of global humanitarian governance should be discussed with regard to the implications of a global governance by a structure of ‘the-counted-as-permissioned’, alluding to Alan Badiou, provided by permission-based blockchain systems. As offered in the conceptual framework by Alain Badiou, a structure is “what prescribes, for a presented multiple, the regime of its count-as-one. When anything is counted as one in a situation, all this means is that it belongs to the situation in the mode particular to the effects of the situation’s structure” (Badiou 2005, 24). In this particular structure of permissioned blockchain used on refugees, then, is the new “regime of rights” in cyber space which follows the same trajectory of its analogous predecessor where “[t]hese so-called Rights increasingly presented themselves as the rights of victims, the rights of those unable to exercise their rights or even to claim any in their own name, so that eventually their rights had to be upheld by others.” (Ranci re and Corcoran 2010, 62)

IrisGuard’s (trusted) board of directors include Richard Dearlove, the former head of M-6 - the British foreign intelligence service; and Frances Townsend, the former international and homeland security advisor to G. W. Bush (Twig

2022); and the company is known to receive 1% from each transaction conducted in the camp (Schlüter 2019). Because the code developed and maintained by IrisGuard is not open-source, we do not know what kind of user data is included in the transactions forwarding 1% to the company each time a refugee initiates an (trans)action. It may be that these transactions to the company include the information of the initial transaction conducted by the refugee and which could infer behavioral patterns, what the individual buys, where they go, and who they transact with. As Isedua Oribhabor, U.S. Policy Analyst at Access Now explained, such a dystopian scenario of blockchain-use is “completely unnecessary, we have no idea as to the data they collect, what they do with that data, or if any attempts are made to keep it safe.”¹⁷

A normative theory of governance, Gerry Stoker explained, “rests in its capacity to provide a framework for understanding changing processes of governing.” (Stoker 1998, 18) Governance is a “systemic co-ordination form of partnership ...in designed, intentionally chosen and adopted governance orders or structures” involving “a greater willingness to cope with uncertainty and open-endedness on the part of policy-framers.” (Stoker 1998, 22–23) In UNHCR’s application, the blockchain-use assures that the refugees receive services or make payments merely by scanning their irises, but the individual refugees are left with nil authority within a global network in which they are immutably encoded and recorded at all times, or, as IrisGuard’s founder puts it, until they are 100. As there is no openness on the side of the code employed in the permissioned governance structure, and the use of a technology of trustlessness notwithstanding, we still have to trust IrisGuard to control the detrimental effects of blockchain “on communities and individuals who lack influence over the technologies and data that increasingly shape and control their lives.” (Herian 2018, 163) What is at stake in immutably securing the

¹⁷ Access Now, a non-profit organization for civil rights, published the interview on Apr 12, 2021 on <https://www.accessnow.org/irisguard-refugees-jordan/> - Retrieved on October 10, 2022.

biometric data and its association with the identity of ‘the refugee’ in a permissioned network is not only that the person to whom the identifying information belongs is unauthorized to administer her own information, but also that a security breach will affect those who are permissionless the most. To avoid uncertainty and open-endedness, IrisGuard trusts the storage of the biometric information it collects on individuals to blockchain – an immutable ledger that is stored by too many nodes to be destroyed. This is described as “a condition of subjugation for which the living participants to these systems do not even share knowledge of the algorithms governing their spaces.” (Roio 2018, 5) In this context, as interdisciplinary researcher and software developer Denis Jaromil Roio explained in a documentary¹⁸, named Trust in the Blockchain Society, “algorithmic transparency ... is something that we should claim as a real “human right.” In UNHCR’s application, however, the blockchain serves the function of rendering the identities of persons seeking assistance and protection merely as “refugees” within a manageable system – ‘the-structure-of-the-count-as-permissioned’. Badiou’s understanding of the “inconsistent multiplicity” as what cannot be unified into (any)one in the “structure-of-the-count-as-one” is here defined by ‘permissionlessness’, an “existential position ... in excess of the coherency of the language” dominant in traditional governance (Badiou 2005, 45). Investigation into the ‘inconsistent multiplicity’ is outside the scope of this thesis, but such research will be useful to identify “the subjects of government specified in new ways, in terms of an ethic of activity which establishes new divisions between those who are considered to be competent citizens and those who are not” (Rose 1994, 337). The permissionless mode of the ‘multitude’ of users who, despite the system advantages of their inclusion into the network as permissioned nodes, constitute a distinct (non)political category in the structure of global governance should open a theoretical discussion on the technological

¹⁸ Trust in the Blockchain Society is a smart phone documentary reachable at <https://www.trustblockchainsociety.com/>

application of the “regime of rights” where rights present themselves as what Ranciere called ‘the rights of victims’. As Todd May observed,

Once people are thought to be objects of distribution rather than subjects of creation, then hierarchy is inevitable. The idea that those who distribute equality are simply performing an administrative task hides a deeper problem. It divides people into those who are politically active and those who are politically passive. And to be politically passive is not to be equal, in the creation of one’s own life, to those who are active. (May 2010, 5)

Hence, the permissionless condition of the refugee refers to a structure where the technology is used as “a reassertion of the political power that the blockchain is specifically constructed to dismantle” (Golumbia 2016, 76). As computer scientists observe, “[b]ecause blockchain technologies address enduring needs for permanent, indelible, and trusted ledgers, they will likely be around in various forms for a long time.” (Sherman et al. 2019, 75) Moreover, blockchain is a notational technology which works by specifying the context-based arising of distinct identities and operationalizing them in a notational schema to represent the prevalent context (Dupont 2017). With the use of smart-contracts built on top of blockchains, the present context-specific identities can be utilized in the future auto-implementation of the contract by the system itself (Reijers, O’Brolcháin, and Haynes 2016). In this regard, the choices of blockchain model and the terms of smart contracts used in governance systems imply future outcomes. Considering the risks involved with complex code structures that are closed to scrutiny and development by others, such as in the example of Facebook’s inability to control its own code, the robust nature of the digital ledger combined with ‘centralized’ and ‘non-public’ administration of a network that stores biometric information of individuals immutably recorded as refugees invites great concerns.

3.3 Road to Developing Alternative Models: A Diffractive Approach

Like in any socio-technical analysis, it is crucial to acknowledge that the gap between technology users and non-users constitute the biggest challenge of a theoretical analysis on the political implications of blockchain-based governance systems. The social, economic, and geopolitical conditions reinforcing this gap withstands the most effective governance model achievable by a computer-based technology. Nevertheless, in a Heideggerian line of thinking, if technology is understood only as a tool that is used as a means to an end, such as a broom used for sweeping, or a telephone to communicate with audio through distance, than we assume an apriori causality at work in being that makes it a 'being'. In his *The Question Concerning Technology*, Heidegger (1954) explained how, for example, when we consider the cause for the technology of broom, we would find the cause to be the broom maker who made it. However, he explained, this line of thinking reveals only the "efficient cause", one of the four causes Aristotle put forward for being. The efficient cause being the thing that brought the broom into being, the other three causes would be the 'material cause', or what the broom is made of, and the 'formal cause', or the appearance or shape of the broom, and the 'final cause', or the function or purpose that broom was created for. Heidegger pointed out that if it was not for the final cause, the efficient cause would never have had the incentive to bring this thing into being. In other words, if it wasn't for brooming, why would anyone make a broom in the first place. Moreover, according to Heidegger, it is all four of these causes that are not only all necessary but also so interconnected that they are all responsible for each other. In this perspective, it is the entanglement of all four causes that eventually manifests the existence of what was potentially a being, a broom. Such potentialities are all around us, both as beings and nonbeings, such as in a piece of clay that can become things in a hundred years that are not imaginable today. His understanding utilizes the Ancient Greek notion of technology as the art of

bringing forth such potentialities, such as crafting a bowl from a portion of clay. What makes modern technology different from traditional technology, according to Heidegger, is our way of looking at things which has changed drastically from that of the artisan who looked at clay in a way that brought forth the relationship between the thing and the onlooker. The manifestation of the bowl affirms how the onlooker relates to the clay as part of an experience of the world where s/he needs the presence of a bowl, for example, to eat from. In other words, the special relationship between the being that looks and the thing that is looked at used to be revealed through technology, affirming their interconnectedness through the thing that comes into being. As this relationship is lost and left its place to alienation in modernity, we began to look at the world as that which can be exploited; and hence, we have been bringing forth only the most useful for our conjectural ends. Technology has become a way we act on the world, the mode of exploitation of nature as a resource for some *particular* other thing. The more we measure and weigh things, the more alienated we become to understanding what being *can be* as we become obsessed with what *is*.

The contemporary form of this thinking is found in the New Materialist approach to understanding phenomena as what comes into being through “intra-actions”, that is, not as a result of an interaction between two separate things but the intra-action through which they become two separate things within the act of research itself (Barad 2007). This is called the “agential realist” approach to research which, influenced by physics and feminist philosophy, describes reality as what manifests depending on the research apparatus - the overall material *and* discursive conditions of a research setting including the measurement tools and the researcher herself (Coole and Frost 2010). Agential realism means to understand that a researcher will always inevitably execute cuts in a measurement that define the borders and properties of a phenomenon in accordance with the intelligibility that is specific to the material conditions and discursive traditions she embodies in research. The cuts executed by the researcher, ‘the agential cuts’, draw the boundaries

between what is intelligible and what is not, thereby *performing* as the phenomenon that serves as the referent of knowledge. Agential realist researchers strive to be aware of this performance and its implications on the being that is brought forth by all causes, explained by Heidegger through the interdependent nature of Aristotle's four causes of being, and by the quantum physicist and New Materialist philosopher Karen Barad as "the ontological inseparability of intra-acting agencies" (Barad 2007, 333)

This study adopts the new materialist perspective that research as a practice affects and is affected by phenomena that are iteratively produced due to the intra-active nature of reality. Adopting the 'agential realist' perspective to research allows to affirm the phenomenon of blockchain as what is already being adopted by individuals and groups who lack the ability to code software programs but who join online communities where software programming is taken care of by other members of the community. Many individuals and groups also use open-source or commercial applications with interfaces designed to simplify the use of blockchain. The fact that many organizations and institutes outsource the development of their blockchain-based governance systems to private firms is not only dangerous but also unnecessary. This research so far showed that the most distinguishing aspect of the consensus mechanism is its ability to instill confidence in governance processes without a third party to trust to. By outsourcing the system design to parties outside of the group or organization by which the blockchain network will be used, users forego their self-government and trust the design of their governance model to outsiders. Where operations refer only to system architecture and not to delegated authorities, the issue of governing the blockchain itself "remains one of the most controversial aspects for public sector organizations, ... [because] understanding what to govern (or not to govern) and how to govern is fundamental to adopt blockchain in the public sector." (Tan, Mahula, and Cromptvoets 2022, 1) This requires, not the skill to code Web 3.0 applications, but a thorough understanding of the properties and functionalities of the blockchain technology and its side applications such as the smart contracts, the

context in which they will be used for governance operations and, finally, the political-theoretical perspectives on justice and democracy as the tenets to which the system can refer. A passing knowledge of system architecture and its functioning mechanisms is necessary, not only to understand how to utilize this technology for the good of the public, but also to evaluate if the good will of its utilization is truly reflected into its implementation.

Nevertheless, apart from introducing ourselves to the existing ways of bringing forth the potentialities inherent in this new virtual setting we are in, we should not identify this technology with its efficient cause only. Instead of essentializing blockchain with already available governance systems, we can look at it in a way that will bring forth different structures formerly imagined or still a potentiality in political philosophy. In line with Heidegger, we do not have to appreciate modern technology as the possible solution to every problem such as economic inequality nor understand it as the very thing that has caused such problems to come into existence, for example by industrialization. Instead, we can stop thinking about technology, or blockchain, as what is exterior to and hence separate from us, but rather understand it as part of the apparatus through which ‘the political’ manifests. Heidegger’s critique of modern technology emphasized the exploitative attitude towards the world as a thing that is, in a Cartesian understanding, exterior to the human being which looks at it. Traditionally, a farmer had a more symbiotic relationship with the land he cultivated, but the fields that yield the sugar do not look the same to Nestle today. With modern technology, the world has turned into a reserve that we look at only in terms of how we can utilize it for more gain and profit. In the new materialist discourse, this utilizing look is identified with the ‘performative cuts’ of a researcher, and anyone producing knowledge and technology, configuring “what matters and what is excluded from mattering” (Barad 2007, 394). In this line of thinking, research does not reflect but diffract reality, diffraction being a physical phenomenon that occurs when two different sets of waves encounter each other and, in their superimposition, reveal a pattern that does not otherwise occur, such as the behavior of light as

waves or particles depending on the conditions of the overall apparatus. Hence, if blockchain-based governance is to be diffractively analyzed, the research should refer to the political aspirations that motivates its use (Bogost 2017); but, it should not equate it with these motivations and, instead, try to understand how certain motivations intra-act with the apparatus through which different governance systems manifest. Accordingly, “rather than viewing technologies such as blockchains as a rude departure from all preceding political theory, they should enter into a conversation with legacies such as the separation of powers, [and] theories of sovereignty” (Schneider 2019, 17). Hence, in the following chapter, a selection of modern and contemporary political theory perspectives on ‘democracy’ and the concept of the ‘political’ will be read through each other to develop an interference pattern for a normative analysis on blockchain-based governance. The selection of concepts and theories follows the research principles of affirmative and diffractive reading as offered by Barad’s ‘agential realism’ which recognizes the constructive effect of research on its object. Doing so, the research seeks to imagine the road to alternative models of governance which can be collectively conducted and hence empirically tested using the blockchain technology.

CHAPTER 4

TECHNOLOGIES CODING ‘THE POLITICAL’ INTO THE NEW WEB

4.1 Developing User-Generated Authority as the ‘General Will’

While the technology precedes Blockchain, smart contracts had to be executed on centralized servers were it not for the invention of the distributed ledger. Thanks to Satoshi Nakamoto, smart contracts can now be operated by the very network which hosts their code (Wright 2021), making possible “for a large number of unconnected contributors or volunteers to spontaneously enter into a collaborative arrangement and to form a leaderless organization.” (Krishnan 2020, 47) Novel structures of governance are actively being developed by users utilizing the Web 3.0 apparatus – the smart contract integrated blockchain networks run by DApps to collaborate on various issues of collective concern or aim. These users volunteer and/or contribute to shared goals by using smart contracts to store the terms and conditions of their operations which are predetermined by all involved parties in a collaborative and collective fashion. As such, the introduction of smart contracts to Blockchain has led to new forms of organizations, namely the Decentralized Autonomous Organizations (DAOs), whose governance principles and operational decisions are bound by the principle of ‘user-generated authority’ over ‘user-generated content’. Previous distributed organizations of Internet communities such as Wikipedia or Anonymous (hackers) had so far lacked this technology which “facilitates interaction, alignment of interests, trust, and transparency in a way that was not possible before” (Bellavitis, Fisch, and Momtaz 2022, 7). Algorithmic

solutions to the processes of decision-making and implementation are co-produced by members of DAOs from around the world. An increasing number of designs are collaboratively formed by the involved communities to organize around collective goals by utilizing the operational efficiency of the Web 3.0 for security, accountability, and transparency for digital operations, and without the authority and consent of anyone but theirs'. The DAOs are growing in numbers and the collectively taken decisions are auto-executed by the smart contracts used, and the decisions are "open for public audit by all members of the organization (and potentially even the public), helping to ensure that procedural rules for decision-making have been followed" (Wright 2021, 160). The self-execution of the terms previously agreed upon by users in these networks implies a future of autonomous governance of individuals without the need of state authority to ensure compliance to laws.

Not surprisingly, DAO formations that offer "new ways of organization and new forms of cooperation that do not require any fixed hierarchical organizational structures" had been used as an analogy for Thomas Hobbes' depiction of the Leviathan since the "(s)mart contracts make it possible for a large number of unconnected contributors or volunteers to spontaneously enter into a collaborative arrangement and to form a leaderless organization." (Krishnan 2020, 47) In such an attempt, Wessel Reijers, Fiachra O'Brolcháin, and Paul Haynes (2016) analyzed the parallelisms between 'the social contract' as envisioned by Hobbes, Rousseau, and Rawls, and the governance model of blockchain. The authors conclude that "Nakamoto's account is similar to the one offered by Hobbes – both accounts envision the potential for corrupt behavior in a situation of uncertainty." (Reijers, O'Brolcháin, and Haynes 2016, 141). Building up on previous formal analysis of blockchain governance by Donncha Kavanagh and Gianluca Miscione (2015), who pointed to blockchain's resolution of the distrust between merchants and customers in business transactions, Reijers and et.al. argue that the game-theoretic justification of a blockchain-based governance "is most similar to the justification of the social contract presented by Hobbes, in that it is based on a

rather negative assessment of human nature, being self-interested and potentially corrupt, and tends to reduce social interactions to game-theoretical problems.” (Reijers, O’Brocháin, and Haynes 2016, 141) In contrast, they eliminate Rousseau’s account for viewing the human society “as naturally peaceful and friendly”, and claim, without presenting an empirical research on their views, that “(t)he blockchain community, in contrast, envisions human nature and especially the notion of “trust” in humans as the corrupting factors in contemporary civilizations.” (Reijers, O’Brocháin, and Haynes 2016, 140)

Contrary to this analysis, this study finds that blockchain-based governance where the terms to reach a shared goal is encoded into the smart contracts that function as the rules of operation, is more similar to Rousseau’s understanding of the “general will” for the shared incentive that initiates the formation of a DAO. In a genealogical thinking, Blockchain’s inception as a solution to the Byzantine Generals Problem leads this study to disagree with Reijers, O’Brocháin, and Haynes on blockchain’s resemblance to the Hobbesian understanding of the sovereign that is made up of individuals which were previously at war with each other. DAOs governed by blockchains consist of individuals who are self-incentivized to contribute to the organization’s governance where governance corresponds to the collective execution of a course of action on a shared concern or will. The hypothetical Byzantine Generals who lacked blockchain were not at war with each other, but, to the contrary, they were a unity in that their attack could only be successful if it was conducted simultaneously. The fact that they could not trust the validity of incoming messages because they suspected the presence of disloyal Generals among the group is not the same with the idea that “humans will engage in corrupt behavior if it serves their self-interest” (Reijers, O’Brocháin, and Haynes 2016, 141). The ‘consensus mechanism’ is built on the idea that the majority of network participants will act benevolently, and that this loyalty of the majority will act as the security wall against any possible, but definitely not a natural, act of malevolence. The consensus mechanism generates ‘trustlessness’ through trust in reasonable behavior by a majority of actors.

As Giovanni Caparioni (2015) explains with regard to Rousseau, “(t)he direct exercise of legislative power by all members of an established political community is the only legitimate form of Sovereignty. ... Only by adopting a social pact founded on the people of the Sovereign acting as a “collective” law-maker, can the subscribers avoid the danger of ending their lives under “despotism” (2015, 61). Rousseau explained that when citizens lawfully gather together, any one of the citizens becomes as important as the greatest ruler; because where the represented is present, there is no more representation (Rousseau, Dunn, and May 2002). Unlike the ‘permissioned blockchain’ used by the UNHCR, participatory structures available in DAOs enable an equitable distribution of governance roles where no party is merely represented but rather is actively present. “Because of their decentralized nature, DAOs offer transparent, distributed, and decentralized decision-making that increases disintermediation not only within organizations, but also at the market, industry, and economy levels. The distinction between shareholders, managers, and other stakeholders, such as industry participants, is blurred, giving rise to numerous benefits” (Bellavitis, Fisch, and Momtaz 2022, 4). Moreover, Rousseau explained that when different individuals gather and consider themselves to form a whole together, this whole will have only one will; and this ‘general will’ will be concerned with the well-being and comfort of everyone that makes up the whole. When this unity of the whole is the basis of the state, the state, its resources, and its functioning will be strong and simple, and its rules will be clear. There will be no contradictions since it will only take common sense to see the common good. In such a state, Rousseau explained, very few laws are required. When a new law is necessary, it will be evident to everyone; and the individual person who proposes the new law will be doing so to express a need felt by everyone. In this perspective, only the social contract itself requires unanimity. For any other law, citizens may not get what they voted for but should understand and accept that if the general will is different from the individual will, then the individual will lacks validity for being beneficial for each and every part of the whole.

In terms of DAOs, since there can be no ‘ex-ante agreement’ on what constitutes a blockchain network, an individual’s participation in the organization directly redefines the network as a whole but only by aligning with and expressing what is beneficial for everyone in the organization. Hence, an individual’s participation in a DAO governance is always both a contribution to the network as a whole, and—to herself – or to her cause – as part of the whole. Being a part of the whole here should not be confused with the Hobbesian account of the Leviathan, which presents a “political doctrine in which we find, first, an absolute and arbitrary political power joined with a moral demand for complete, simple and unquestioning political obedience and, second, the concept that no action of the sovereign can ever be unjust or even criticized” (Tarlton 2001, 589) On the contrary, evident in the Byzantine Generals Problem is that even the existence of a disloyal General among the Byzantines points to the existence and the extent of another network of which the traitor General is a part. This is not the same as arguing that any General may act against its own network at any moment on which it is feasible, but that individuals always share causes with others but not always within the networks of which they are a part. According to Rousseau, “if the people in the system are generally dissatisfied with the government, they could desert the agreement.” (Graham Jr. 1970, 92) DAO governance mechanism not only enables but is rather specifically developed to ensure that, withstanding cybersecurity attacks, an individual member of a DAO that is disloyal to its terms has to be honest and appear as disloyal by proposing changes to the smart contract. If this proposal is opted for as a future course of the DAO by its members, the proposer is not a traitor but a leader that has no other power than participation in the course of action. “In a decentralized organization, there’s no clear leader, no hierarchy, and no headquarters. When a leader does emerge, that person has little power over others. The best that person can do to influence people is to lead by example.” (Brafman and Beckstrom 2006, 18–19) On the contrary, the Hobbesian framework considers the body politic as what acts on ‘collectivized decisions’ which are “decisions that apply to, and are enforced

on, a collectivity regardless of whether they are taken by the one, the few, or the many. The defining criterion no longer is *who* makes the decisions, but their scope: Whoever does the deciding, *decides for all.*” (Sartori 1987, 214) According to Rousseau, however, “(if) the people simply promises to obey, it dissolves itself by that act and loses its character as a people; the moment there is a master, there is no longer a sovereign, and forthwith the body politic is destroyed.” (Rousseau, Dunn, and May 2002, 170) Thus, thinking with Rousseau allows us to imagine blockchain as the communicative-base through which, not a solitary Leviathan but the ‘general will’ is achieved by groups in various different forms and sizes.

In other words, unlike the body politic conceptualized by Hobbes as where “(w)hoever does the deciding, *decides for all*” (Sartori 1987, 214), Rousseau allows us to envisage blockchain as the apparatus through which groups of varied shapes and sizes attain their ‘general will’ not once but through an open-ended, iterative, and participatory process. Doing so allows us to see the perils of ‘permissioned’ blockchains and immature protocols that may become detrimental. Accordingly, this study suggests using open-source blockchain structures that take into account the variety of reasons for blockchain(s) construction and enable individuals who do not agree on what is being offered to never be subject to its rule. This is in line with Rousseau’s definition of the ‘general will’ as what is desired and/or required by everyone, regardless of who expresses it. However, the issue of expression itself remains obscure. In the context of disinformation, propaganda, deepfake and similar conjectural issues of Internet today, the norms and forms regarding expression matters more than it hitherto had. Hence, the blockchain models developed should provide governance models in which a plurality of subject points can be accommodated in the face of an authoritative majority. To enquire into such a model, the following section will discuss the democratic conditions of plurality and justice through the conceptual lens of John Rawls’ “original position” which he defined as the condition of a deliberative process that is inclusive and participatory, yet selective and upholding a standard. Rawls’ “original

position” serves as the footing on which democratic decisions are taken by individuals whose reasons are removed from and not distorted by particular features and circumstances of their “background framework”. In his theory, the pluralistic “background culture” of the modern society is the culture of the ‘social’, not of the ‘political’. The ‘social’ here is comprised of all the “comprehensive doctrines” relating to individuals’ reasons, be it based on religion or ideology. (Rawls 1985, 250) The culture of ‘the political’, however, is comprehensive of all “comprehensive doctrines” so far as they pertain to a “shared fund of implicitly recognized basic ideas and principles” (Rawls 1985, 228). In this sense, the political is a limited domain separate from the private lives of individuals, and hence, expels those particular reasons engendered by private lives devoted to particular comprehensive doctrines. With regard to understanding how we can design DAOs that enables the ‘political’ to manifest yet still be just to all participants, John Rawls’ procedural approach to justice and democracy provides valuable insights to consider when developing blockchain-based governance designs. Similarly, in 2007, Amit Schejter and Moran Yemini had observed that the advancement of Internet finally offers us the technical ability to achieve freedom of expression, and hence, its regulation’s “first goal should be to improve the situation of the least advantaged” (Schejter and Yemini 2007, 171). In terms of access to Internet, the authors offered the theory of distributive justice as “the most appropriate framework for an underlying theory of regulation of Internet access. Over the Internet, everyone is potentially a speaker. The theory of justice is designed first and foremost to help realize that potential.” (Schejter and Yemini 2007, 171)

4.2 DAO Decision-making in Terms of ‘Justice as Fairness’

In his, *A Theory of Democracy Revisited*, Giovanni Sartori (1987) talks about “procedural consensus” as where democracy begins, and its function as

providing the conditions where “dissensus is assumed and required to bring about *changes in consensus*, that is, a new consensus or new consenters on different things.” (Sartori 1987, 91) The question of governance, then, concerns the model used to reach consensus, and the procedure in place to enable its dynamism. Cyberspace is a pool of diverse opinion and a plethora of information, and the amount of data available by Internet presents a singularity in history; however, “with a large mix of irrelevant noise, bullshit, and expressions of hatred, and the segregation of views from one another with each segment working to deepen its own views in opposition to the others, diversity, expression, and access may be limited, despite the apparent gains.” (Cohen and Fung 2021, 39) To develop politically just governance models to be encoded in smart contracts, then, requires more than contemplating on how to digitize traditional governance structures but to understand the very context in which we aim for democracy where the variety of standpoints include, for example, bots that create millions of fake news. “Aside from the question if blockchain use increases or not, governance is not independent from context, quite the contrary: context shapes the requirements, to which appropriate governance mechanisms are tailored to.” (Ziolkowski, Miscione, and Schwabe 2020, 14) In the context of cyberspace where the plurality of subject positions depend on the cluster effect of attention-exploiting ads, bots and propaganda material; developing a subject position on political issues requires more than information gathering and posting an opinion online. Hence, in order to avoid aggregative democracy procedures in cyberspace where the sum of opinions overwhelms genuine standpoints, we need to structure not only “a political system in which all the members are equally entitled to participate in the association’s decisions about its laws and policies, including in the prevoting deliberative stage” (Landemore 2021, 67) but also where “the deliberative ideal should be, ultimately, “many connected brains” seamlessly and almost simultaneously exchanging information and arguments in ways that are costless and frictionless, resulting in enlightened individuals and enhanced collective intelligence.” (Landemore 2021, 77)

This question of how private individuals with particular doctrines can reach a consensus which outweighs all else, including their own, is practically the same that concerned the Byzantine Generals, and it had been answered by John Rawls in 1993 via his formulation of a “political conception of person” which, he argues, satisfies the ‘freedom’ and ‘equality’ of all individuals on the basis of possessing “two moral powers with the idea of social cooperation - a capacity for a sense of justice and for a conception of the good.” (Rawls 2005, 93) Having these powers to the minimum requisite, he explains, makes any individual equal to others. These private reasons of individuals are not allowed in what Rawls calls the “original position”- an embodied position of neutrality towards “comprehensive doctrines of all kinds” in the society-, through which ‘the political’ is engendered by the public, that is, no-longer-private reasons of individuals. (Rawls 2005, 383) As members of a DAO are part of an effort, rather than an identity, that strives for achieving common goals, “actors of a blockchain system are mutually dependent” and procedures to incentivize participation and to avoid segregative practices in doing so is crucially important (Ziolkowski, Miscione, and Schwabe 2020, 5). Similarly, “Rawls’s “original position” is meant to serve as a rationale for the contracting individuals to engage in a social contract able to promote justice as fairness for all its contracting parties. The original position - where parties can always weigh any decision against the constitutional points of references, that is, the “public political culture”- serves as the process of cleaning out the remnants of “comprehensive doctrines” from truth claims. Stripped of private characteristics, individuals in the ‘original position’ will be able to approach the “background culture” of their society, in a way that recognizes all comprehensive doctrines at work in the social life of private individuals regardless of their intrinsic value. According to this account, individuals in the original position may not rely on or derive from any particular one of these comprehensive doctrines when making political decisions. Rather, they will be commanded solely by the principles of ‘justice as fairness’, which are the principles of noninterference and toleration. By way of utilizing this theoretical

device, Rawls claims, we can establish political institutions satisfying the principles of a liberal conception of justice that does not rely on a preemptive economic, religious or moral doctrine but rather work to realize the political values and ideas that belong to the ‘public political culture’. To conceptualize how the ‘public political culture’ may function as the point of reference on an individual level, Rawls further describes ‘the veil of ignorance’ as what should be donned on in decision-making. The purpose of the veil is to make sure that individual concerns for private gain convert into a system of rules that are equitable for everyone. In the context of blockchain-based governance, ‘the veil of ignorance’ can be constructed through incentivization mechanisms, for example, by automatically rotating governance roles among DAO members not only to prevent concentration of power and ensure what is fair for all of the DAO members, but also to enforce the achievement of what contributes to the cause that constitutes the DAO’s formation as a body politic. Whether the system is successful or not depends on the model used and not on technology, because “the technology itself functions as a “veil of ignorance” in that it is unable to discriminate between its users, in contrast to conventional institutions.” (Reijers, O’Brolcháin, and Haynes 2016, 140) Moreover, as human intervention is minimized in DAOs, operations can be streamlined through automated processes. For example, smart contracts need to check information from outside the DAO network to independently verify if terms of an agreement have been fulfilled. The sources of oracles which search for this information has to be decided upon by members or an algorithm must be developed for the auto-selection of sources, such as by random selection or as seen fit by the ready-to-use oracle program chosen. Oracles provide the smart contracts with external data from outside the blockchain network used, enabling the auto-execution of pre-coded terms in the smart contract when informed about whether the conditions have been met. An example use could be a DAO focused on wildfire prevention, the Oracle checking the heat and humidity of a concerned area and feeding that information to a smart contract which is encoded to automatically start operations, such as initiating fire-

prevention measures – checking stocks, ordering needed supplies, issuing payments etc. Many such DAO formations exist to protect forestry, wildlife, local economy, or to govern their own climate action¹⁹. Many of these applications that inform a smart contract about the fulfillment of an agreement’s conditions are decentralized themselves, preventing the data flow and its validation by monopolies. In terms of decision-making by DAO members, similar technologies can be used “to bring democratically significant information to citizens’ attention and foster demand for such content.” (Cohen and Fung 2021, 48) Users can be made to ensure that network users receive the same real-time information collected and validated by a decentralized network and sifted by software programs that are nonselective, that is, not customized for what is known about the user without the user’s permission. In this sense, Rawl’s concept of ‘the veil of ignorance’ can be utilized to try and understand the nonselectivity that needs to be encoded in the software.

The ‘veil of ignorance’ can also be utilized as a model for envisioning the nonhierarchical governance of a network whose participants are motivated by a ‘general will’, as formulated by Rousseau, in their deliberations leading to decision-making. Among other prominent figures, Rawls had been influenced by Immanuel Kant in his approach to democracy and his delineation of the conditions in which it is possible. In the face of pluralism and the doctrines and emotions that may blur rational assessments and detriment the manifestation of the ‘general will’; Rawls followed the Kantian approach to ‘reason’ which is above mere ‘understanding’, or ‘judgement’, and hence, has a political capacity. In the Kantian framework, we can say that ‘the political’ corresponds to the reason(able) which is the episteme leading to the third maxim of an enlightened human understanding. In his “On Taste As A Kind of Sensus Communis”, Kant envisions a political process as the development of ‘sensus

¹⁹ A less than complete list of DAOs currently in existence can be found here: <https://deepdao.io/organizations>

communis' or "the idea of a communal sense", and the communal sense defined by a definitive process of consecutive steps of using human cognitive capacities constitutes 'reason' (Kant 1987). Briefly, there are three maxims to Kant's 'communal sense' which are thinking for oneself, putting ourselves in the place of everyone else, and always thinking consistently. To think for oneself corresponds to an unprejudiced thought that is essential to a mature mind whose understanding is self-driven and hence free from coercion of others' thoughts. In this sense, the first maxim entails that one trusts one's own reasoning above anyone else's and this constitutes what Kant calls 'understanding', which is a common capacity of all human beings. The second maxim, to put ourselves in the place of everyone else, on the other hand, corresponds to our need for other persons' reasoning to go beyond our own mentality limited to our particular socio-historical positions in time. In this sense, the second maxim entails the provision of attaining an "enlarged mentality", one that goes beyond unprejudiced understanding to reflecting upon that understanding from a universal standpoint. This enlarged thought, according to Kant, constitutes 'judgement'. In his third maxim, Kant introduces a combination of the first (unprejudiced thought) and the second (enlarged thought) in what he calls the "consecutive thought" which, in the general sense, constitutes Reason. In an age of Enlightenment, Kant argued, we are to progress towards an enlightened reason which builds up on the human capacity to understand by thinking by himself, to judge by putting him in the place of others, thereby reflecting on his prior understanding, and finally combining these two in comparing his judgement with the collective reason of humanity, that is, comparing our judgement also with the possible judgements of others.

For the objective of this study, however, one non-Kantian approach that must be taken into account when trying to design governance models in cyberspace, is the more radical branch of democracy theory, namely the "agonistic approach" (Mouffe and Laclau 1985). Authors like Chantal Mouffe argued for the de-coupling of the notions of 'reason' and 'the political', which she claims to stem from irrational and unreasonable motives rather than rational reasons,

describing a Rawlsian society as “a society from which politics has been eliminated.” (Mouffe 2009, 29) According to this approach, the Rawlsian view of ‘public political culture’ assumes the preexistence of a universal ‘reason’, as put forward by Kant, and it risks rendering nonpolitical all those discourses (stemming from passions) that are unintelligible in the dominant mainstream culture. In her ‘The Democratic Paradox’, she criticized Rawls for relegating ‘the controversial doctrines’ to the private sphere since “it is possible, in his view, to establish in the public sphere a type of consensus grounded on Reason.” (Mouffe 2009, 28) If noncompliance occurs in this “Rawlsian well-ordered society”, she explains, “it must be due to ‘irrationality’ or ‘unreasonableness’.” (Mouffe 2009, 29)

Mouffe emphasized that in modern democracies, the political domain has been reserved, not to what is ‘authentic’ and different, but to what is assumed to be ‘common’ to all individuals. Accordingly, in the course of establishing a sterilized sphere for a political subjectivity inspired by the Enlightenment notion of the modern ‘Self’, individual and/or group differences among the society were jammed up in the domestic space of the ‘private’. Historically, both liberalism and civic republicanism, she explained, strived to describe this political space as separate from that of the private. In this respect, an idea of the ‘unitary subject’ was adopted to delineate a subjectivity worthy of appearing in the political space only. This idea was prevalent both in the notion of an ‘unencumbered self’ figured within the tradition of liberalism, and in the ‘unitary situated self’ of the civic republicanism (Mouffe 2009). Both notions were attempts to sketch a political subject fit for the public domain whose contours, as Mouffe argued, inevitably posit only one subject in distinction, and hence exclude all others. She founded her own theory of democracy on the impossibility of a sketch that could contour all subject positions and asserted that the notion of a ‘unitary subject’ merely works to shift the sole subject of the political domain from God or Nature to the Man and his Reason in capital initials. Mouffe’s critique concerning the Kantian approach to ‘reason’ and its political connotations reveal how the Rawlsian

liberal principles of justice “impose restrictions on what are the permissible conceptions of the good that individuals are allowed to pursue.” (Mouffe 1991, 73) To the contrary, she argues that the task of political philosophy should be the creation of ever new subject positions and a multiplicity of what is ‘good’ in the society. Accordingly, she further argues, radical democracy’s task is to allow for “contractual agreements” to be reached by different groups whose demands should be articulated through the new subject positions (Mouffe 2009). According to Mouffe, then, we need to pursue a new ‘common sense’ through ‘contractual agreements’ which will not define ‘sensus communis’ as a universal.

In the context of blockchain-based governance in DAO formations, however, the ‘sensus communis’ is common only to the network participants, and the ruling principle in its formation should be the capacity of understanding and judgement formation that is shared by all human beings. This is not the same with presuming that Kant’s third maxim of reason will manifest and function as the God rule for all individuals. It is simply assigning all individuals the capacity for the first two maxims, to form an understanding and judgement, which, in a Heideggerian sense, is relating to what is in front of them, to look at the material of cyberspace as it is now, and bring forth something new. When thinking with Mouffe, an immutable digital ledger keeping technology coupled with self-operating ‘social contract(s)’ that are wearing the ‘veil of ignorance’ may prove detrimental depending on the design choices embedded in the network governance structures. However, DAO formations can be thought of as small autonomous groups which may or may not be connected or have sub-groups. How, why, and when a new group will emerge is entirely indeterminate. Groups are formed in accordance with members’ meaningful contribution to a cause that defines the DAO. When anyone contributes to the network, the smart contract will most definitely execute the individual action in the network, making it public. The contribution, however, has to be what is needed by everyone in the network since everyone is organized around the work to be done to reach a common aim. Hence, the most significant feature

of DAOs is their availability to be generated and/or be participated by all willing individuals. In this sense, the technology provides a new communication base for assembling new digital public spaces where anyone can be 'visible' in accordance to their will. If this will is the 'general will' of a network's participants, the smart contract will execute it. This feature of providing visibility to verified anonymity in the public space accommodates radical democracy approaches to be accommodated in a blockchain analysis alongside classical theories of social contract and contemporary understandings of the modern subject and their ability for 'reason' as judged required for democratic decision-making. In order to dwell on how being visible relates to the conditions of public conduct, the following will explore Hannah Arendt's understanding of the 'political' and its condition as the 'appearance' of the human condition of plurality.

4.3 'Appearance' as the Human Condition of 'Judgement'

The contemporary political-philosophical debate around what constitutes 'the political' and whether that is achievable through streamlining processes of democracy is relevant to understanding how DAOs envision decision-making processes and to whether these visions risk detrimental effects on individuals' political agency. With the participatory nature of DAO governance mechanisms, the discussion of who rights the code as put forward by Lawrence Lessig now refers to who votes and how valuable that vote is. As evident in the cybernetic vision of engineering an ideal stable society, positivism has led the way in upholding rationalism and secularity as the necessary requirements of a sound judgment over governance processes. This spirit and its influence on software development is exemplified in Lessig's quote: "There is a magic in a process where reasons count – not where experts rule or where only smart people have the vote, but where power gets set in the face of reason. The magic is in a process where citizens give reasons, and citizens understand that power

is constrained by these reasons.” (Lessig 1999, 228) Ever since Lessig exclaimed it in 1999 the slogan ‘code is law’ is increasingly more relevant to our practices of justice mediated through the code that regulates behavior both in the digital space and in tangible environments such as the refugee camps. Nevertheless, what the Internet community now has in stock along with blockchain technology is the smart contracts that “make it possible for a large number of unconnected contributors or volunteers to spontaneously enter into a collaborative arrangement and to form a leaderless organization.” (Krishnan 2020, 47) Hence, the vision of “a stable society” is kept alive by the blockchain community and its “manifestations of autonomous digital organizations” (Nabben 2021, 5). “What we have witnessed thus far might be the first phase of the Internet, characterized by the transfer of information via simple networks. Today, a second phase of network computing is emerging—one that enables the secure, end-to-end, and computationally validated transfer of value (whether it is represented by money, assets, or contractual arrangements) via smart networks.” ((Swan and de Filippi 2017, 604–5) The technology of blockchain enables the visibility of this value, and the smart contracts verify its validity by auto-executing its content. In a Heideggerian sense where technology means to relate to what is in front of us, technologies of information and communication allow us to relate to the new materials of the cyberspace: the human togetherness, collectivity and the collaboration of the particularities found in the plurality of our individual consciousnesses. By the same token, participation and the appearance of difference in the cyberspace reconfigures this apparatus through which the ‘sensus communis’ manifests. In Arendtian terms, this appearance of the difference creates “new beginnings” by the virtue of being witnessed by others. Appearance of a conduct as what is different to others make it an ‘action’ that is inevitably participated by everyone who share the same space and virtually see the difference there is.

Through participation from newcomers, a blockchain takes on a life of its own that is neither controlled by one participant or group, nor is it undesired by any of its members who are bound by its smart contract. In order to avoid a

specification of these participants in terms of a ‘subject’ whose reasoning capacities and habits are considered to be fit for participation, we must form a plural understanding of the digital public sphere where any DAO and the particular ‘general will’ that operates as ‘the reason’ of their smart contracts can be understood, not as what is universally public, but as what is common only to its own participants. In this respect, the Arendtian understanding of the ‘common world’ is explanatory for a DAO governance mechanism whose existence depends solely on the presence of participants. Adopting the Kantian proviso that we can only know the external reality in the particular way that our minds impose upon it, Hannah Arendt (Arendt 1998) envisioned the ‘Socratic dialogue’ as a method that enables us to understand our consciousness through understanding of ‘the doxa’ – that is the opinion offered by each conversant in a Socratic dialogue. These conversations reveal how the ‘common world’ functions as cognized by different individuals from different standpoints. Drawing on Kant’s “enlarged mentality” in her book *Between Past and Future*, Arendt (2006) explained,

(L)ogic, to be sound, depends on the presence of the self, so judgment, to be valid, depends on the presence of others. Hence judgment is endowed with a certain specific validity but is never universally valid. Its claims to validity can never extend further than the others in whose place the judging person has put himself for his considerations. Judgment, Kant says, is valid “for every single judging person,” but the emphasis in the sentence is on “judging”; it is not valid for those who do not judge or for those who are not members of the public realm where the objects of judgment appear. (Arendt 2006, 217)

In this perspective, any one opinion is not superior to another one, because together they offer a kaleidoscopic view of the matter at hand. These opinions reveal the workings of our own consciousness and what it imposes on the common world; and, it is the free exchange of these opinion in the public sphere that enables the fulfillment of Kant’s second maxim of the ‘sensus communis’, that is, putting yourself in the place of the other. In the Arendtian framework, in order for judgement to manifest, it needs its subject to be visible. In ‘The Promise of Politics’, Arendt explained that “if we understand (as the

Greeks understood) the polis as the public-political realm in which men attain their full humanity, their full reality as men, [it is] because they not only are (as in the privacy of the household) but appear.” (Arendt 2005, 87) Thus, being seen, it can be said, worked in Ancient Athens as a confirmation that the act has been realized and hence the actor has been legitimized through the realization of one’s image of himself as he wants to appear in public. This public appearance/realization in the Arendtian approach, we should note, is not the fulfillment of a standard or unitary ‘Self’ that can make it the target of a critique by Mouffe for being considered common to all human beings. Rather, the experience of appearing in public is the performance of authenticity by each citizen of the polis. Here, individuals appeared in public in a ‘performance’ of their political self which strictly denied their private commonness with other human beings in physical and material needs. Surprisingly, this perspective on political behavior proves valid in research on behavioral patterns of social media use today (Lottridge and Bentle 2018).

In their research on what motivates content creation and the ways this content is distributed online, Danielle Lottridge and Frank R. Bentle (2018) have found that when individuals tend to share online their ideological opinions, and information that contributes to that ideology, they do it in ‘public’ posts; whereas, when they share their individual interests and needs, they do it in ‘private’ messages. What is required in models of governance, then, is to design open procedures whereby individuals can easily judge whether an issue is ideological, that is if it reflects the ‘general will’ of the network, and can easily publish information or opinion contributing to that ideology. What is more, the underlying structure should enable change to be initiated in the ‘general will’ by participants who can organize around the new proposal, as well as the formation of new networks by participants who manifest the existence of a new common world among each other that is not shared by all members in the network from which they might depart. As the contract doctrine emphasizes, the principles of justice are the principles of willing cooperation among equals.” (Rawls 1999, 58–59) and, by the nature of being the social

animals we are, we are “capable of creating meaningful lives with one another, talking with one another, understanding one another, and reasoning about ourselves and our situations. Our social and political contexts, while sometimes difficult and complex, do not involve essential mysteries that we are in principle incapable of comprehending without the assistance of a savant of some sort.” (May 2010, 7) Thus, using the new technology, individuals who self-identify with diverse group identities can join in a network without providing unneeded information or agreeing with other group members on matters other than what they agree to in the smart contract. As a result, it is more illuminating to discuss about blockchain-based governances rather than a single 'Blockchain-based governance' in order to grasp its functionality for forming new political entities. A new blockchain can be readily produced among individuals who do not completely share the motivation behind their current organization. The new blockchain network's significance is based solely on its creation, not on who participates in the network, but on what inspires its genesis, which cannot discriminate among its users. Hence, if we understand the 'common world' and its relation to 'judgement' as what makes a personal understanding on an issue public by means of appearance to others, we can envision DAO governance models as plural manifestations of what is 'public'. DAO members can construct “common world(s)” around the “general will” which is reached by deliberations following the procedure of “justice-as-fairness”.

This approach proposes a new and multiple conception of 'reason' and the 'public space' where individuals' involvement in the 'judgement' generated concerns the 'political'. A new DAO may simply be constructed and accessible to contributions, demonstrating the existence of a viewpoint and its commonality among network users by being visible to everyone in the cyberspace. In order to achieve shared goals, such as workers' interests, and without running the risk of fascism or sexism as warned by Mouffe, we might construct DAOs with smart contracts to ensure the equality of diverse struggles - "conceptions of the good." Furthermore, members may easily break off to

form a new chain with new contractual terms that have been jointly approved by all members if such a contract disappoints one or more of its constituents. The reason for the creation of the new blockchain may be different from the reason for the previous blockchain; however, the new reason must be valid for all participants who contributed to the creation of the new blockchain by agreeing on the proposal that serves as each group member's personal incentive to join the network. This vision was suggested by Rousseau's notion of the 'general will' as that which motivated the body politic. In line with Rousseau's definition of the 'general will' as what is wanted and/or required by everyone, regardless of who expresses it, Web structures allow people who do not agree on what is being offered to never be subjected to its rule. Doing so, the 'reason' described by Kant as the 'sensus communis' may be constructed by blockchain technology, not in a unitary but rather multiple form, being differentially performed by group members and realized in the formation of various governance structures. In this sense, blockchain serves as the apparatus through which 'actions' may be observed by all members of the digital society, and smart-contracts enable the construction of new public space(s) through varying degrees of connectedness among members. This offers a chance to understand what is 'the political' without referring to the nature of a human being or the 'initial position' of their togetherness, and rather to see that the DAOs represent "the sheer human togetherness" as Arendt offered it, "where people are with others and neither for nor against them". (Arendt 1998, 180)

Arendtian perspective on the constitution of the public space and its relation to 'judgement' as what makes a personal understanding on an issue relate to another person through a 'Socratic dialogue' allows us to imagine the digital generation of plurality regarding 'the general will' and the 'sensus communis' as what forms, what Arendt had called, 'the common world'. Through proposing a change or update in the smart contract, any participant of a decentralized blockchain-based organization, a.k.a DAO, 'understands' the need for a change for themselves and thereby fulfill the first maxim of Kant's 'sensus communis'. Once the proposition passes as a transaction in the network

for others to see and make a judgment upon, the second maxim of forming a judgment through input from another individual is completed. Finally, depending on participation by other members, the initial proposal can be judged valid and necessary to act upon, thereby creating the reason which consolidates the change in the smart contract. Alternatively, the proposal may be reasonable for not all but only some of the members of the community, to branch out as a group from the initial blockchain to form one anew. Since blockchain allows for any opinion to become public by means of appearance to others regardless of one's personal identity, DAO decision-making processes are non-exclusionary as they are observed as manifestations of not-yet-common worlds ready for 'new beginnings' through participation. This participation can be the mere reading and contemplating on the proposal that evolves in front of everyone sharing the space of its appearance that is the network. As any one of the not-yet-common worlds can imminently become a 'common world' by the virtue of being observed, as Arendt offered it, this research finds that the governance structure of permissionless blockchains has a Rawlsian liberal understanding of justice and equality achievable through measures of reaching the Kantian reason. However, the technical characteristics of blockchain and the tools available for its use by individuals further imply that constituents of autonomous governance systems can utilize this technology to form 'Judgment(s)' which is, as Arendt put it, "endowed with a certain specific validity but is never universally valid." (Arendt 2006, 217) The 'judgement', as Arendt offered it, becomes valid only when an observer's reasoning capacities – including one's tools of measurement, calculation and discourses of analyses, engages into a 'Socratic dialogue' with what manifests in their witnessing. In new materialist terms, the dialogue we engage in matters in forming the 'phenomenon' as the common understanding of what it is that is visible.

Phenomena, Karen Barad explains, "are the effect of boundary-drawing practices that make some identities or attributes intelligible (determinate) to the exclusion of others" (2007, 208). In an agential realist context, then, we should

conceptualize ‘blockchain-based governance’ as that which can be plural and mutable, avoiding essentializing practices and identifications. To do so, this study employed the research method of diffractive reading which allowed to employ a vision of human subject(s) that is neither techno-neutral nor defined by technology; rather, it is the technology itself that should be considered as a relational phenomenon which we cannot identify without engaging with it. This approach will help us move beyond the discussions around “governance-by-technology” and “governance-of-technology”, and allow for envisioning the terms of ‘governance-with-technology’ and in multiple forms. According to ‘agential realism’, researchers as well as subjects of governance are actively involved in the making of its structure. Hence, we need to imagine tools through which individuals can not only be governed - as in biometrics used by UNHCR - but with which, in an Arendtian sense, appear to others without risking prosecution, bias, or other detrimental costs. Moreover, to create public spaces whereby the similarly incentivized may gather and collaborate on a political action, we need to address the eligibility of Blockchain and, in particular, its demand for high-skill coding for development. However, blockchain shows parallelism in its developmental trajectory to the World Wide Web protocol which first enabled the infrastructural access to Internet for only the very tech-savvy, and lay people with little or no programming skills had to rely on third party providers for website building or network access for a decade. This has rapidly changed with the introduction of both free and charged services of user-friendly website development applications. Later, as concepts of User Interface (UI) and User Experience (UX) gained popularity in 1990s, easy-to-use website building and management tools and the ready-to-use content publishing platforms began to proliferate and lessened the required knowledge of computer programming necessary to be present online. However, the first Web, as well as its second predecessor, allowed only for appearance through a center or intermediary which held various degrees of authority on the person who appeared. As Arendt offered it, the actor of a ‘action’ that constitutes the ‘political’ dis/appears the moment that action is

observed. The action defines the actor, independently of who they were before. Web 1.0 and 2.0 protocols are centralized and do not allow for such anonymity; but many Web 3.0 platforms are being developed to offer visibility to individuals and causes that are verifiably real since their immutable recording is supported by a multiplicity computer users. Hence, the adoption of blockchain developing as a practice by individuals with no coding skills needs similar platforms like those of easy website building. Such DAO building tools have been proliferating with early examples such as Aragon, their website claiming that we “govern better, together”. As another one, Clarity, claims “(m)aking DAOs more accessible starts with the tools we use to participate in them,” providing user interface and experience enhanced services for creating and participating in DAOs without expert knowledge of software programming is crucial. Such tools make it easy to found an organization, establish rules and procedures for its functioning, enable others to participate in it, and follow up on the duties and activities fulfilled by the participants. All blockchain properties such as that which allows any member to propose roadmaps for the DAO, or particular solutions for a situation, as well as the functionalities of permissioned blockchains to limit member participation in a segregating fashion, are available with the ease of use provided by these online applications. To affirm and utilize this technology, then, is to intra-act with the phenomena of governance systems that are to come. As Mouffe had put it,

It is only under these circumstances that struggles against power become truly democratic. Political philosophy has a very important role to play in the emergence of this common sense and in the creation of these new subject positions, for it will shape the 'definition of reality' that will provide the form of political experience and serve as a matrix for the construction of a certain kind of subject. (Martin 2013, 100)

CHAPTER 5

CONCLUSION

The thesis starts with an explanation of Internet's development as a product of open participation and collaboration by all willing and able individuals worldwide. The protocol of the World Wide Web which enabled the use of Internet also by nontechnical individuals, and this protocol's trajectory of centralization and decentralization is followed through periods of Web 2.0 and Web 3.0. The study presents similarities between the development trajectory of Internet and that of Blockchain, offering an exploration of blockchain's history starting from the prominent question of computer sciences, named the Byzantine Generals Problem, which prompted its invention. Later, the blockchain-based web protocol that is called the Web 3.0 is analyzed for features of decentralization and user-generated authority over digital content, explaining why the technology is referred to as revolutionary not only in the cyberspace but also in organization and governance. In this regard, initial formal analyses on blockchain and its use in governance are offered to elaborate on the technology's disruptive as well as detrimental potentials.

Later, two different uses of blockchain-based governance are explored; first, through the analysis of an empirical case of 'permissioned' blockchain-use by the United Nations High Commissioner of Refugees (UNHCR), and later, through the case of Decentralized Autonomous Organizations (DAOs) which employ the original (permissionless) structure of blockchain-based governance. The UNHCR started using the technology in 2017 to resolve issues around refugees' registration in the Zataari Refugee Camp in Jordan, and the managing of their identities within contexts of assistance and

protection. To do this, UNHCR partnered with the British-based biometrics company named IrisGuard, who encoded individuals biometric iris data as private keys to their stored data on the blockchain. This enabled a seamless process of aid delivery to individuals whose irises are scanned for identification. UNHCR explains that the technology decreased financial costs associated with transaction fees and fraud protection by a 95%. However, because of the permissionless nature of their participation in the blockchain network, the individual refugees lack authority over the storage and use of their own data and are not even permitted to opt out of the system. In such an application, the blockchain serves the function of rendering the identities of persons seeking assistance and protection merely as “refugees” within a manageable system over which not even the UNHCR but the company IrisGuard maintains sovereignty. In this regard, the second chapter of this thesis focuses on the political-theoretical implications of encoding ‘permissions’ into immutable and robust governance mechanisms in terms of the risks involved in specifying “the subjects of government ... in new ways, in terms of an ethic of activity which establishes new divisions between those who are considered to be competent citizens and those whose are not.” (Rose 1996, 337) To do so, theoretical analyses on ‘permissioned blockchains’ from analytical philosophy and political theory perspectives, as well as empirical studies from computer sciences are offered to problematize their use in global governance practices despite the security vulnerabilities and the detrimental effects on individual political agency in these systems. This chapter further argues that theoretical research on ‘permissioned blockchains’ can reveal the ontological implications of a global governmentality endorsed by digital technologies whose premature deployment risks immutable effects in alignment with their technical strengths. Hence, conceptual analysis on the new digital categories such as the ‘permissioned’ and the ‘permissionless multitude’ is recommended to investigate whether these notions can be adequately captured by conceptualizations of ‘the political’ offered in contemporary political theory. In a governmentality approach, such research will provide

valuable insights on how blockchain technology mediates power and, more generally, how an unequal capacity for decision-making is produced and distributed using new technologies.

Political implications of the ‘permissioned blockchains’ notwithstanding, the features of transparency, accountability, and immutability of Blockchain deserves an analysis of the legitimacy offered by the governance model enabled by this technology. Analysis on empirical cases of blockchain-use in governance imply both that blockchain can be critically detrimental to individual rights and liberties, and that active involvement in the development and implementation of new models that are informed with political theory hold disruptive potentials. In this regard, in the last section of the second chapter, the alternative uses of blockchain-based governance by DAOs are presented to support an affirmative analysis of open participation and ongoing collaboration in the making as well as maintenance of a governance system which does not discriminate against its own constituents. Blockchain offers a new form of “algorithmic trust” which makes possible decentralized as well as dynamic decision-making, the automatic implementation of pre-decided decisions, and issuing of orders and contracts without the need of human agents overseeing the process. As Matthew Ball puts it in his article for Times magazine, “It’s not difficult to imagine how different the internet would be if it had been created by multinational media conglomerates in order to sell widgets, serve ads, or harvest user data for profits” (Ball 2022) In the same vein, this study hypothesizes that, with participation informed with political theory from scholars and action researchers, DAO governance formations hold the potential to overcome the dichotomy between democracy and justice by designing and executing blockchain architectures where theories of democracy and justice are diffracted. To support this hypothesis, the study offers qualitative research to demonstrate that blockchain-based DAOs present a singular phenomenon of collective effort to, both theoretically and empirically, investigate the most proper organization form in which to establish democratic governance. To extend an affirmative approach to the use of blockchain by DAOs, the analysis

uses the ‘diffractive approach’ commonly used in new materialist research to enquire not what blockchain-based governance is, but rather what blockchain-based governance may become through participation informed with political theory.

Diffraction, or interference, is a physical phenomenon that occurs when two different sets of waves encounter each other and, in their superimposition, reveal a pattern that does not otherwise occur. In physics, “diffraction apparatuses”²⁰ have long been used by researchers to observe ‘interference patterns’ (Young 1801) which show complementary behaviors of matter that cannot be observed outside of their diffraction (Bohr 1996). This thesis argues for an inquiry on blockchain not in terms of what it inherently is, or what has become of it in particular uses, but what can be brought forth through relating with this technology in a theoretically informed way. In this regard, the diffractive analysis in this thesis starts with reading DAOs through the theory of social contract as offered by Jean-Jacques Rousseau. The constitutive aspect of the ‘general will’ and the democratic procedure of its formation is discussed with regard to technical specificities of blockchains and smart contracts used by DAO formations. Later, with regard to the significance of smart contracts and the nature of ‘the mind’ that meets to encode them with the terms of the ‘general will’, John Rawls’ understanding of ‘justice’ which entails the Kantian understanding of ‘the mind’ is incorporated into the analysis. As the Kantian approach to ‘reason’ and its relation to what constitutes ‘the political’ is assessed, it is found that DAO governance formations enable consensus on ‘the general will’ through the steps that Kant described to form the ‘sensus communis’. This enabled to scrutinize whether ‘the mind’ that is involved in a smart contract is formulated in terms of an exclusionary idea of an ‘unencumbered Self’ that risks discrimination towards individuals as in

²⁰ The famous ‘double-slit’ first used in Thomas Young’s 1801 experiment is a ‘diffraction apparatus which reveals the behavior of light as both as particles and as waves.

'permissioned blockchain' structures. The analysis finds that the Rawlsian procedure of 'justice as fairness' can be accommodated in a DAO governance structure which allows for regeneration of the 'sensus communis' within the blockchain network where all participants agree to the terms of change, and, similarly in line with Rousseau's understanding of the 'general will', any member of the network who disagrees with a change in the smart contract cannot be a part of the collectivity that forms the DAO. However, due to the structure of blockchain, a new network can be founded among members who generate and encode their own will that is generalizable only to the members of the new network. Hence, the blockchain technology enables plurality through the creation of new subject positions as advocated by authors like Chantal Mouffe and Ernesto Laclau. In this sense, the analysis allows radical democracy theories to coexist in a blockchain study with classical theories of social contract and contemporary understandings of the modern subject.

Finally, an Arendtian perspective on what constitutes the public space and its relation to 'judgement' as what makes a personal understanding on an issue relate to another person through a 'Socratic dialogue' is investigated. Since blockchain allows for any opinion to become public by means of appearance to others regardless of one's personal identity, DAO decision-making processes are non-exclusionary and allow for visibility without risking prosecution, bias, or other detrimental costs. Arendt's approach to Kant's notion of 'judgement' helps us imagine any opinion offered in cyberspace to reveal the workings of our own consciousness and what it imposes on the common reality. According to the Arendtian analysis, it is the free exchange of these opinions in the public realm that allows for Kant's second dictum of the 'sensus communis,' that is, placing oneself in the place of the other, to occur. Since we can only place ourselves in the place of someone that we know, that is, that we recognize as that particular person among others, that person needs to be visible to us. Arendt's emphasis on an action's appearance and its condition as the existence of a public space comes from this proviso that leads to the formation of 'judgement'. As she puts it, "(j)udgment, Kant says, is valid

“for every single judging person,” but the emphasis in the sentence is on “judging”; it is not valid for those who do not judge or for those who are not members of the public realm where the objects of judgment appear.” (Arendt 2006, 217) In the context of this study, the Arendtian reading of DAO governance networks reveal that they enable the plural manifestation of what is ‘public’, created by the condition of opinions being observed by others in the network. To create public spaces whereby the similarly incentivized may gather and collaborate on a political action, then, we can use DAO governance formations where the free exchange of opinions is provided by ‘user-generated authority’. In an Arendtian sense, plurality being the human condition of action, the analysis shows that the DAO governance formations offer a chance to understand what is ‘the political’ without referring to the nature of a human being or the ‘initial position’ of their togetherness. Rather, DAOs represent “the sheer human togetherness where people are with others and neither for nor against them”. (Arendt 1998, 180)

Overall, this thesis claims that, through the Web 3.0 apparatus, DAO members construct “common world(s)” around the “general will” which is reached by deliberations following the procedure of “justice-as-fairness”. On the other hand, ‘permissioned’ blockchain structures, which do not allow for open participation and initiation of change in the smart contract by all members, represent a governance structure as the ‘count-as-permissioned’, alluding to Alain Badiou, where the majority of network members are permissionless and hence subjectivized to the decision-making of a predetermined consortium. The study showed that individual rights, such as data privacy, are considerably less likely to be violated when protected by a permissionless blockchain system than when protected by centrally run systems. Individuals are not obligated to trust the storage of their data on central servers, much alone expose it to corporate third parties for a network transaction. In this regard, with support from research in computer sciences and analytical philosophy, the study recommends the use of original (permissionless) blockchain for the governance of public services, national and global humanitarian aid practices, as well as

decentralized autonomous organizations, to avoid the detrimental effects of governance by a consortium whose foundation in a blockchain network is immutable. Instead, increased participation, collaboration, scholarly interest and practice based action research into the making and the governance of blockchain networks is called for. The one and only example of political scientific participation this study could find in the development of blockchain-based governance technologies is the CommonsHood Project that have been funded by Union of International Associations' (UIA) European Regional Development Fund (ERDF) and developed by the University of Turin in collaboration with its departments of Computer Science and Law, Economics, Political Science and Urban Studies Department. And the City of Turin. Their participation resulted in the inclusion of the residents of the city of Turin to be included in the design choices employed in the governance structure used by the project. Considering the risks involved with complex code structures that are closed to scrutiny and development by others, the robust nature of the digital ledger that stores biometric information of individuals immutably recorded as refugees requires similar attention and scientific workload. Thus, this study recommends a detailed examination of the empirical uses of blockchain in cases of international cooperation such as in refugee response operations. In a political theory perspective, such research would manifest the current organization of the globe and map out the relationship between digital technologies and the practices of global governance. In this sense, more research on the nexus of blockchain and global governance is needed to explore several questions including i) in what ways is the current organization of the globe realized in the forms of its digital governance, and to what extent do the use of blockchains work to (re)create the existing inequalities and/or contribute to the formation of new ones?, ii) how can we design normative research to examine the consequences of implementing algorithmic solutions in global governance efforts?

BIBLIOGRAPHY

- Arendt, Hannah. 1998. *The Human Condition*. 2nd ed. Chicago: University of Chicago Press.
- . 2005. *The Promise of Politics*. Edited by Jerome Kohn. New York: Schocken Books.
- . 2006. *Between Past and Future: Eight Exercises in Political Thought*. Penguin Classics. New York: Penguin Books.
- Arquilla, John, and David F. Ronfeldt. 2000. *Swarming & the Future of Conflict*. Santa Monica, CA: RAND.
- Aste, Tomaso, Paolo Tasca, and Tiziana Di Matteo. 2017. “Blockchain Technologies: The Foreseeable Impact on Society and Industry.” *Computer* 50 (9): 18–28. <https://doi.org/10.1109/MC.2017.3571064>.
- Axelsen, Henrik, Johannes Rude Jensen, Department of Computer Science, University of Copenhagen, Universitetsparken 5, DK-2100 Copenhagen, Denmark, and Omri Ross. 2022. “When Is a DAO Decentralized?” *Complex Systems Informatics and Modeling Quarterly*, no. 31 (July): 51–75. <https://doi.org/10.7250/csinq.2022-31.04>.
- Badiou, Alain. 2005. *Being and Event*. London ; New York: Continuum.
- Ball, Matthew. 2022. “The Coming Worlds. the Metaverse Is Still under Construction, but It’s Sure to Change Our Lives.” *TIME*, 2022.
- Barad, Karen. 2007. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham: Duke University Press.
- Beck, Roman. 2018. “Beyond Bitcoin: The Rise of Blockchain World.” *Computer* 51 (2): 54–58. <https://doi.org/10.1109/MC.2018.1451660>.
- Bellavitis, Cristiano, Christian Fisch, and Paul P. Momtaz. 2022. “The Rise of Decentralized Autonomous Organizations (DAOs): A First Empirical Glimpse.” *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4074833>.
- Berners-Lee, Tim. 1998. “The World Wide Web and the ‘Web of Life.’” *The World Wide Web Consortium (W3C)* (blog). 1998. <https://www.w3.org/People/Berners-Lee/UU.html>.
- Berners-Lee, Tim, James Hendler, and Ora Lassila. 2001. “The Semantic Web.” *Scientific American* 284 (5): 34–43.

- Bogost, Ian. 2017. "Cryptocurrency Might Be a Path to Authoritarianism." *The Atlantic*, May 30, 2017. <https://www.theatlantic.com/technology/archive/2017/05/blockchain-of-command/528543/>.
- Brafman, Ori, and Rod A. Beckstrom. 2006. *The Starfish and the Spider: The Unstoppable Power of Leaderless Organizations*. New York: Portfolio.
- Brighouse, Harry, and Marc Fleurbaey. 2010. "Democracy and Proportionality." *Journal of Political Philosophy* 18 (2): 137–55. <https://doi.org/10.1111/j.1467-9760.2008.00316.x>.
- Buterin, Vitalik. 2014a. "Ethereum: A Next-Generation Smart Contract and Decentralized Application Platform.," 36.
- . 2014b. "Ethereum: A Next-Generation Smart Contract and Decentralized Application Platform." https://ethereum.org/669c9e2e2027310b6b3cdce6e1c52962/Ethereum_Whitepaper_-_Buterin_2014.pdf.
- Caporioni, Giovanni. 2015. "Rousseau's General Will." *Poliarchia* 2 (5): 59–92. <https://doi.org/10.12797/Poliarchia.03.2015.05.04>.
- Casino, Fran, Thomas K. Dasaklis, and Constantinos Patsakis. 2019. "A Systematic Literature Review of Blockchain-Based Applications: Current Status, Classification and Open Issues." *Telematics and Informatics* 36: 55–81. <https://doi.org/10.1016/j.tele.2018.11.006>.
- Cohen, Jashua, and Archon Fung. 2021. "Democracy and the Digital Public Sphere." In *Digital Technology and Democratic Theory*, edited by Lucy Bernholz, Hélène Landemore, and Rob Reich. University of Chicago Press. <https://doi.org/10.7208/chicago/9780226748603.001.0001>.
- Coole, Diana, and Samantha Frost, eds. 2010. *New Materialisms Ontology, Agency, and Politics*. Durham and London: Duke University Press.
- Davidson, Sinclair, Primavera De Filippi, and Jason Potts. 2016. "Disrupting Governance: The New Institutional Economics of Distributed Ledger Technology." *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2811995>.
- Dilger, W. 1997. "Decentralized Autonomous Organization of the Intelligent Home According to the Principle of the Immune System." In *1997 IEEE International Conference on Systems, Man, and Cybernetics. Computational Cybernetics and Simulation*, 1:351–56. Orlando, FL, USA: IEEE. <https://doi.org/10.1109/ICSMC.1997.625775>.
- DuPont, Quinn. 2014. "The Politics of Cryptography: Bitcoin and the Ordering Machines." *Journal of Peer Production*, no. 4.
- DuPont, Quinn. 2017. "Blockchain Identities: Notational Technologies for Control and Management of Abstracted Entities: BLOCKCHAIN IDENTITIES." *Metaphilosophy* 48 (5): 634–53. <https://doi.org/10.1111/meta.12267>.

- El Faqir, Youssef, Javier Arroyo, and Samer Hassan. 2021. "A Scalable Voting System: Validation of Holographic Consensus in Daostack." In *Proceedings of the Annual Hawaii International Conference on System Sciences*. Virtual: IEEE Computer Society.
- Emmett, Jeff. 2019. "Conviction Voting: A Novel Continuous Decision Making Alternative to Governance." *Medium - Giveth* (blog). July 3, 2019. <https://medium.com/giveth/conviction-voting-a-novel-continuous-decision-making-alternative-to-governance-aa746cfb9475>.
- Epstein, Charlotte. 2008. *The Power of Words in International Relations: Birth of an Anti-Whaling Discourse*. Massachusetts Institute of Technology.
- Forman, Christopher, Joachim Henkel, Aija Elina Leiponen, Llewellyn D W Thomas, Peter Altmann, Hanna Halaburda, Aija Elina Leiponen, and Daniel Obermeier. 2019. "The Trust Machine? The Promise of Blockchain-Based Algorithmic Governance of Exchange." *Academy of Management Proceedings* 2019 (1): 13603. <https://doi.org/10.5465/AMBPP.2019.13603symposium>.
- Franke, Mark F. N. 2020. "Refugees' Loss of Self-Determination in UNHCR Operations through the Gaining of Identity in Blockchain Technology." *Politics, Groups, and Identities* 10 (1): 21–40. <https://doi.org/10.1080/21565503.2020.1748069>.
- Galia, Kondova, and Renato Barba. 2019. "Governance of Decentralized Autonomous Organizations." *Journal of Modern Accounting and Auditing* 15 (8): 406–11. <https://doi.org/10.17265/1548-6583/2019.08.003>.
- Geerts, Evelien, and Iris van der Tuin. 2016. "The Feminist Futures of Reading Diffractively: How Barad's Methodology Replaces Conflict-Based Readings of Beauvoir and Irigaray." *Rhizomes: Cultural Studies in Emerging Knowledge*, no. 30. <https://doi.org/10.20415/rhiz/030.e02>.
- Columbia, David. 2016. *The Politics of Bitcoin Software as Right-Wing Extremism*. Minneapolis: University of Minnesota Press.
- Graham Jr., George J. 1970. "Rousseau's Concept of Consensus." *Political Science Quarterly* 85 (1): 80–98.
- Green, Ben, and Yiling Chen. 2019. "The Principles and Limits of Algorithm-in-the-Loop Decision Making." *Proceedings of the ACM on Human-Computer Interaction* 3 (CSCW): 1–24. <https://doi.org/10.1145/3359152>.
- Henderson, Harry. 2003. *Encyclopedia of Computer Science and Technology*. New York, NY: Facts On File.
- Herian, Robert. 2018. "Taking Blockchain Seriously." *Law and Critique* 29 (2): 163–71. <https://doi.org/10.1007/s10978-018-9226-y>.
- Hijab, Annette. 2019. "Identity Provision in Refugee Camp Management: Biometric Technology and Iris Scanning in Jordan." *Borderline-Europe*, June.

- Hughes, Kobina. 2017. "Blockchain, The Greater Good, and Human and Civil Rights: BLOCKCHAIN, THE GREATER GOOD, AND HUMAN AND CIVIL RIGHTS." *Metaphilosophy* 48 (5): 654–65. <https://doi.org/10.1111/meta.12271>.
- Kant, Immanuel. 1987. *Critique of Judgment*. Translated by Werner S. Pluhar. Indianapolis, Ind: Hackett Pub. Co.
- Kirstein, P.T. 1999. "Early Experiences with the Arpanet and Internet in the United Kingdom." *IEEE Annals of the History of Computing* 21 (1): 38–44. <https://doi.org/10.1109/85.759368>.
- Konashevych, Oleksii. 2019. "Why 'Permissioned' and 'Private' Are Not Blockchains." *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3496468>.
- Korpala, Gaurish, and Drew Scott. 2022. "Decentralization and Web3 Technologies." Preprint. <https://doi.org/10.36227/techrxiv.19727734.v1>.
- Krishnan, Armin. 2020. "Blockchain Empowers Social Resistance and Terrorism Through Decentralized Autonomous Organizations." *Journal of Strategic Security* 13 (1): 41–58.
- Lalley, Steven P., and E. Glen Weyl. 2018. "Quadratic Voting: How Mechanism Design Can Radicalize Democracy." *AEA Papers and Proceedings* 108 (May): 33–37. <https://doi.org/10.1257/pandp.20181002>.
- Lamport, Leslie, Robert Shostak, and Marshall Pease. 1982. "The Byzantine Generals Problem." *ACM Transactions on Programming Languages and Systems* 4 (3): 382–401.
- Landemore, Hélène. 2021. "Open Democracy and Digital Technologies." In *Digital Technology and Democratic Theory*, edited by Lucy Bernholz and Rob Reich. University of Chicago Press. <https://doi.org/10.7208/chicago/9780226748603.001.0001>.
- Lashkari, Bahareh, and Petr Musilek. 2021. "A Comprehensive Review of Blockchain Consensus Mechanisms." *IEEE Access* 9: 43620–52. <https://doi.org/10.1109/ACCESS.2021.3065880>.
- Leiner, Barry M., Vinton G. Cerf, David D. Clark, Robert E. Kahn, Leonard Kleinrock, Daniel C. Lynch, Jon Postel, Lawrence G. Roberts, and Stephen S. Wolff. 1997. "The Past and Future History of the Internet." *Communications of the ACM* 40 (2): 102–8. <https://doi.org/10.1145/253671.253741>.
- Lessig, Lawrence. 1999. *Code and Other Laws of Cyberspace*. New York: Basic Books.
- . 2006. "The Promise for Intellectual Property in Cyberspace." In *The New Media Theory Reader*, edited by Robert Hassan and Thomas Julian, 133–53. New York: Open University Press.

- Long, Jieyi. 2019. "Nakamoto Consensus with Verifiable Delay Puzzle." <https://doi.org/10.48550/ARXIV.1908.06394>.
- Lottridge, Danielle, and Frank R. Bentley. 2018. "Let's Hate Together: How People Share News in Messaging, Social, and Public Networks." In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, 1–13. Montreal QC Canada: ACM. <https://doi.org/10.1145/3173574.3173634>.
- Martin, James, ed. 2013. *Chantal Mouffe: Hegemony, Radical Democracy, and the Political*. New York, NY: Routledge.
- May, Todd. 2010. *Contemporary Political Movements and the Thought of Jacques Rancière: Equality in Action*. Edinburgh: Edinburgh University Press.
- Miscione, Gianluca, and Donncha Kavanagh. 2015. "Bitcoin and the Blockchain: A Coup D'état in Digital Heterotopia?" *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2624922>.
- Mouffe, Chantal. 1991. "Democratic Citizenship and the Political Community." In *Community at Loose Ends*, edited by Miami Theory Collective. University Of Minnesota Press.
- . 2009. *The Democratic Paradox*. Repr. Radical Thinkers. London New York: Verso.
- Mouffe, Chantal, and Ernesto Laclau. 1985. *Hegemony and Socialist Strategy*. United Kingdom: Verso (New Left).
- Nabben, Kelsie. 2021. "Imagining Human-Machine Futures: Blockchain-Based 'Decentralized Autonomous Organizations.'" *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3953623>.
- Nakamoto, Satoshi. 2008. "Bitcoin: A Peer-to-Peer Electronic Cash System." <https://bitcoin.org/bitcoin.pdf>.
- Okada, Hitoshi, Shigeichiro Yamasaki, and Vanessa Bracamonte. 2017. "Proposed Classification of Blockchains Based on Authority and Incentive Dimensions." In *2017 19th International Conference on Advanced Communication Technology (ICACT)*, 593–97. Pyeongchang, Kwangwoon Do, South Korea: IEEE. <https://doi.org/10.23919/ICACT.2017.7890159>.
- Parra Moyano, José. 2017. "On the Continuity and Origin of Identity in Distributed Ledgers: Learning from Russell's Paradox: CONTINUITY AND ORIGIN OF IDENTITY IN DISTRIBUTED LEDGERS." *Metaphilosophy* 48 (5): 687–97. <https://doi.org/10.1111/meta.12272>.
- Pekdemir, Emine. 2021. "The Use of Blockchain Technology in Public Administration: Implications for Turkey." Ankara: Middle East Technical University. <https://hdl.handle.net/11511/93097>.

- Persson, Thomas, Charles F. Parker, and Sten Widmalm. 2017. "SOCIAL TRUST, IMPARTIAL ADMINISTRATION AND PUBLIC CONFIDENCE IN EU CRISIS MANAGEMENT INSTITUTIONS: CONFIDENCE IN EU CRISIS MANAGEMENT." *Public Administration* 95 (1): 97–114. <https://doi.org/10.1111/padm.12295>.
- Polge, Julien, Jérémy Robert, and Yves Le Traon. 2021. "Permissioned Blockchain Frameworks in the Industry: A Comparison." *ICT Express* 7 (2): 229–33. <https://doi.org/10.1016/j.ict.2020.09.002>.
- Rancière, Jacques, and Steve Corcoran. 2010. *Dissensus: On Politics and Aesthetics*. London ; New York: Continuum.
- Rawls, John. 1985. "Justice as Fairness: Political Not Metaphysical." *Philosophy & Public Affairs* 14 (3): 223–51. https://doi.org/10.1007/978-1-349-21763-2_10.
- . 1999. *A Theory of Justice*. Rev. ed. Cambridge, Mass: Belknap Press of Harvard University Press.
- . 2005. *Political Liberalism*. Expanded ed. Columbia Classics in Philosophy. New York: Columbia University Press.
- Reijers, Wessel, Fiachra O’Brocháin, and Paul Haynes. 2016. "Governance in Blockchain Technologies & Social Contract Theories." *Ledger* 1 (December): 134–51. <https://doi.org/10.5195/ledger.2016.62>.
- Reinsberg, Bernhard. 2021. "Fully-Automated Liberalism? Blockchain Technology and International Cooperation in an Anarchic World." *International Theory* 13 (2): 287–313. <https://doi.org/10.1017/S1752971920000305>.
- Roio, Denis Jaromil. 2018. "Algorithmic Sovereignty." University of Plymouth.
- Rose, Nikolas. 1996. "The Death of the Social? Re-Figuring the Territory of Government." *Economy and Society* 25 (3): 327–56. <https://doi.org/10.1080/03085149600000018>.
- Rouhani, Sara, Vahid Pourheidari, and Ralph Deters. 2018. "Physical Access Control Management System Based on Permissioned Blockchain." In *2018 IEEE International Conference on Internet of Things (IThings) and IEEE Green Computing and Communications (GreenCom) and IEEE Cyber, Physical and Social Computing (CPSCom) and IEEE Smart Data (SmartData)*, 1078–83. Halifax, NS, Canada: IEEE. https://doi.org/10.1109/Cybermatics_2018.2018.00198.
- Rousseau, Jean-Jacques, Susan Dunn, and Gita May. 2002. *The Social Contract: And, The First and Second Discourses*. Rethinking the Western Tradition. New Haven: Yale University Press.
- Saad, Muhammad, Afsah Anwar, Srivatsan Ravi, and David Mohaisen. 2021. "Revisiting Nakamoto Consensus in Asynchronous Networks: A Comprehensive Analysis of Bitcoin Safety and ChainQuality." In *Proceedings of the 2021 ACM SIGSAC*

- Conference on Computer and Communications Security*, 988–1005. Virtual Event Republic of Korea: ACM. <https://doi.org/10.1145/3460120.3484561>.
- Sartori, Giovanni. 1987. *The Theory of Democracy Revisited*. Chatham, N.J: Chatham House Publishers.
- Schejter, Amit M, and Moran Yemini. 2007. “‘Justice, and Only Justice, You Shall Pursue’: Network Neutrality, The First Amendment and John Awls’s Theory of Justice.” *Michigan Telecommunications and Technology Law Review* 14: 39.
- Schlüter, Julia Johanna. 2019. “The Right to Be (Un)Seen: Means for Enactment of Human Rights in Situations of Encampment.” Lund University.
- Schneider, Nathan. 2019. “Decentralization: An Incomplete Ambition.” *Journal of Cultural Economy* 12 (4): 265–85. <https://doi.org/10.1080/17530350.2019.1589553>.
- Sherman, Alan T., Farid Javani, Haibin Zhang, and Enis Golaszewski. 2019. “On the Origins and Variations of Blockchain Technologies.” *IEEE Security & Privacy* 17 (1): 72–77. <https://doi.org/10.1109/MSEC.2019.2893730>.
- Stoker, Gerry. 1998. “Governance as Theory.” *International Social Science Journal* 50 (155): 17–28.
- Swan, Melanie, and Primavera de Filippi. 2017. “Toward a Philosophy of Blockchain: A Symposium: Introduction: INTRODUCTION.” *Metaphilosophy* 48 (5): 603–19. <https://doi.org/10.1111/meta.12270>.
- Swartz, Lana. 2018. “What Was Bitcoin, What Will It Be? The Techno-Economic Imaginaries of a New Money Technology.” *Cultural Studies* 32 (4): 623–50. <https://doi.org/10.1080/09502386.2017.1416420>.
- Szabo, Nick. 1997. “Smart Contracts: Formalizing and Securing Relationships on Public Networks.” *First Monday* 2 (9). <https://firstmonday.org/ojs/index.php/fm/article/download/548/469>.
- Tan, Evrim, Stanislav Mahula, and Joep Cromptvoets. 2022. “Blockchain Governance in the Public Sector: A Conceptual Framework for Public Management.” *Government Information Quarterly* 39 (1): 101625. <https://doi.org/10.1016/j.giq.2021.101625>.
- Tarleton, Charles D. 2001. “THE DESPOTICAL DOCTRINE OF HOBBS, PART I: THE LIBERALIZATION OF ‘LEVIATHAN’” 22 (4): 587–618.
- Thiere, Adam. 2014. *Permissionless Innovation: The Continuing Case for Comprehensive Technological Freedom*. Mercatus Center, George Mason University.
- Tiqun (Collective), ed. 2020. *The Cybernetic Hypothesis*. Semiotext(e) Intervention Series 28. South Pasadena, CA: Pulished by Semiotext(e).
- Treiblmaier, Horst, and Christian Sillaber. 2020. “A Case Study of Blockchain-Induced Digital Transformation in the Public Sector.” In *Blockchain and Distributed Ledger Technology Use Cases: Applications and Lessons Learned*, edited by Horst

- Treiblmaier and Trevor Clohessy, 227–44. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-44337-5_11.
- Tseng, Jen-Hung, Yen-Chih Liao, Bin Chong, and Shih-wei Liao. 2018. “Governance on the Drug Supply Chain via Gcoin Blockchain.” *International Journal of Environmental Research and Public Health* 15 (6): 1055. <https://doi.org/10.3390/ijerph15061055>.
- Twigt, Mirjam. 2022. *Mediated Lives: Waiting and Hope among Iraqi Refugees in Jordan*. Forced Migration, volume 43. New York: Berghahn Books.
- Velasco, Pablo R. 2017. “Computing Ledgers and the Political Ontology of the Blockchain: COMPUTING LEDGERS.” *Metaphilosophy* 48 (5): 712–26. <https://doi.org/10.1111/meta.12274>.
- Volk, Christian. 2019. “The Problem of Sovereignty in Globalized Times.” *Law, Culture and the Humanities*, February. <https://doi.org/10.1177/1743872119828010>.
- Weyl, Eric Glen, Puja Ohlhaber, and Vitalik Buterin. 2022. “Decentralized Society: Finding Web3’s Soul.” *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4105763>.
- Wright, Steven A. 2021. “Measuring DAO Autonomy: Lessons From Other Autonomous Systems.” *IEEE Transactions on Technology and Society* 2 (1): 43–53. <https://doi.org/10.1109/TTS.2021.3054974>.
- Zarpala, Lamprini, and Fran Casino. 2021. “A Blockchain-Based Forensic Model for Financial Crime Investigation: The Embezzlement Scenario.” *Digital Finance* 3 (3–4): 301–32. <https://doi.org/10.1007/s42521-021-00035-5>.
- Ziolkowski, Rafael, Gianluca Miscione, and Gerhard Schwabe. 2020. “Exploring Decentralized Autonomous Organizations: Towards Shared Interests and ‘Code Is Constitution.’” In *Exploring Decentralized Autonomous Organizations*. Virtual (India): Zurich Open Repository and Archive. <https://doi.org/10.5167/UZH-193663>.
- Zwitter, Andrej, and Jilles Hazenberg. 2020. “Decentralized Network Governance: Blockchain Technology and the Future of Regulation.” *Frontiers in Blockchain* 3 (March): 12. <https://doi.org/10.3389/fbloc.2020.00012>.
- . 2021. “Cyberspace, Blockchain, Governance: How Technology Implies Normative Power and Regulation.” In *Blockchain, Law and Governance*, edited by Benedetta Cappiello and Gherardo Carullo, 87–97. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-52722-8_6.
- Zwitter, Andrej J., Karsten A. Schulz, and Oskar J. Gstrein. 2020. “Exploring the Governance and Implementation of Sustainable Development Initiatives through Blockchain Technology.” *Futures* 122 (September): 102611. <https://doi.org/10.1016/j.futures.2020.102611>.

APPENDICES

A. TURKISH SUMMARY / TÜRKÇE ÖZET

İnternetin, dünya çapında istekli, yetenekli ve gerekli teknik altyapıya sahip olacak kadar şanslı olan birçok bireyin açık katılımının ve işbirliğinin ürünü olan tarihsel gelişimi, Blokzincir'in 1982'e kadar bilgisayar bilimlerinin en önde gelen sorularından biri olan Bizans Generalleri Problemi'nin çözümü ile başlayan tarihi ile paralellikler göstermektedir. Blokzincirin siyaset teorisi açısından araştırılması kapsamında bu tez, interneti sonunda teknik olmayan bireyler tarafından da kullanılabilir kılmış olan World Wide Web (WWW) protokolünün tarihsel anlamda merkezileşme ve merkezsizleşme yörüngesinin, Web 2.0 ve Web 3.0 dönemleri boyunca da takip edildiğini öne sürmektedir. Blokzincir ve Akıllı Sözleşmeler, Web 1.0 ve Web 2.0'ın ardılı olarak kabul edilen Web 3.0'ın altyapı teknolojileridir. Bu anlamda çalışma, internetin tarihsel gelişim seyri ile blokzincirin gelişim seyri arasındaki benzerlikleri ortaya koyarak başlamaktadır. Bu analiz, Web 3.0 olarak adlandırılan blokzinciri tabanlı web protokolünün, 'dijital içerik üzerinde ademi merkeziyetçilik' ve 'kullanıcı otoritesi' gibi yenilikçi özellikleri açısından analiz edildiğinde, teknolojinin neden sadece siber uzayda değil aynı zamanda organizasyon ve yönetişimde de devrimci olarak adlandırıldığını açıklanmaktadır. Bu bağlamda, blockchain ve yönetişimde kullanımına ilişkin ilk resmi analizler, teknolojinin yıkıcı olduğu kadar zararlı potansiyellerini de detaylandırmak için sunulmuştur.

Web 3.0 genellikle ademi merkeziyetçilik, açıklık, ve eşler arası işbirliği ilkeleriyle bilinir. ABD Senatosu Karma Ekonomik Komitesi 2018 yılında "her düzeydeki devlet kurumlarının, devletin işlevlerini yerine getirmesini daha verimli hale getirebilecek bu teknolojinin yeni kullanımlarını düşünmesi ve incelemesi gerektiğini" bildirmiştir. Bununla birlikte, mevcut yönetişim teorileri, Blokzincir teknolojisinin organizasyon

ve karar alma süreçlerinde sağladığı yenilikçi yönetim biçimlerini açıklamada yetersiz kalmaktadır (A. Zwitter ve Hazenberg 2020). Bu alandaki akademik çalışmalar genel olarak az olmakla birlikte, Blokzincir'e siyaset felsefesi yaklaşımı, organizasyon ve hukuk çalışmalarının çok gerisinde kalmaktadır. Siyaset felsefesi açısından Blokzincir araştırmalarının ender örneklerinden biri, bireylere merkezi otoritelere ihtiyaç duymadan birbirleriyle güvenli bir şekilde işlem yapma imkanı tanıyan blokzinciri teknolojisinin geleneksel olarak ayrıcalıklı olmayan aktörleri güçlendirme eğiliminde olduğunu belirtir (Reinsberg 2021, 3). Bununla birlikte, yönetimde blokzinciri kullanımına ilişkin ampirik vakalar bu normatif analizi doğrulamamaktadır. Blokzinciri tarafından yürütülen kodun 'tasarım tercihlerine' bağlı olarak, özgürleştirici ve güçlendirici yönetim sistemleri sunabileceği gibi, artan teknolojik verimlilik ve bağımlılıkla birlikte, korkutucu derecede baskıcı gözetim ve yönetim de sunabildiği görülmüştür (A. J. Zwitter, Schulz ve Gstrein 2020). Tasarım tercihlerinin siyasi sonuçları, yüksek güvenli bir ağda depoladığı tüm bilgileri değişmez bir şekilde saklayan ve bunlara yönelik yaptırımları otomatik olarak yürüten bu teknolojiyi kullanan topluluklarla çeşitlenmektedir. Bu bağlamda bu çalışma, farklı blokzinciri tasarımlarını, bireysel kullanıcılar için siyasi sonuçları, ve koda dair tasarım seçimlerinin ilgili ağdaki tüm kullanıcılar için katılımcı ve işbirlikçi bir kültür, adalet ve eşitlik içerip içermediği açısından ele alır.

Dağınık defter sistemi, diğer adıyla Blokzincir, başlangıçta herhangi bir tarihsel ya da operasyonel değişikliğin uygulanmadan önce ağdaki tüm katılımcıların en az %51'i tarafından kabul edilmesini algoritmik olarak güvence altına alarak kullanıcılar arasında fikir birliğini teşvik etmek üzere tasarlanmıştır (Nakamoto 2008). Bilgisayar bilimcileri tarafından 'Nakamoto Mutabakatı' olarak adlandırılan bu mutabakat mekanizması, iyi davranışı teşvik eden bir algoritma sayesinde ağ güvenliği ve bakımı için gerekli olan işi tüm paydaşlara dağıtarak, mutabakata katılmanın her birey açısından katılmamaktan daha iyi olmasını sağlar (Long 2019; Saad et al. 2021). Bu özellik, merkezi/ana bilgisayar otoritesine güvenme ihtiyacını ortadan kaldırarak, iletişim ağlarında benzeri görülmemiş bir güvenlik olanağı sunmuştur. Daha önce siber saldırılara karşı her ne pahasına olursa olsun korunması gereken merkezi/ana otoriteye güvenme ihtiyacını ortadan kaldırarak iletişim ağlarında benzeri görülmemiş bir

güvenlik sağlanmıştır. Bu doğrultuda, maliyet verimliliği ve sağladığı güvenlik ile geleneksel modellere göre sahip olduğu ezici avantajlar nedeniyle, blokzincirinin dünya çapında ulusal ve uluslararası kurumlar tarafından giderek daha fazla benimsenmesi söz konusudur (Casino, Dasaklis ve Patsakis 2019; Zarpala ve Casino 2021).

Ampirik blokzinciri uygulama örnekleri, yalnızca farklı sektörlerdeki operasyonların kapsamı açısından değil, aynı zamanda ortaya çıkardıkları farklı yönetim modelleri açısından da büyük bir çeşitlilik göstermektedir. Bunun başlıca nedeni, ademi merkezîyetçilik, katılım ve şeffaflık seviyelerinin ayarlanabildiği 'izinli blokzinciri' gibi daha yeni blokzinciri türlerinin teknik özellikleridir. 'Özel blokzincir' olarak da bilinen bu yeni modelde, ağın yönetim rolleri tüm üyeler arasında yalnızca 'paydaşlar' olarak önceden belirlenmiş bir grup içinde dağıtılır. Tüm ağ bu grubun ön gördüğü bir işleyişle, bu işleyişte değişiklik yapma 'izinleri' önceden tanımlanmış olan seçilmiş birkaç kişi tarafından yönetilir. İzinli blokzincirleri oksimoron bir durum oluşturur "çünkü blokzinciri merkezi olmayan ve halka açık bir teknolojidir, ancak "izinli" merkezi anlamına gelir ve "özel" halka açık değildir" (Konashevych 2019, 2). Yine de, izinli blokzinciri tasarımı çeşitli miktarlarda merkezileştirme, güvenlik, kimlik ve rol tanımı gerektiren kurumsal ve ticari amaçlar için yaygın olarak kullanılmaktadır.

Bilgisayar bilimcileri özellikle kar amacı gütmeyen operasyonlar için kullanıldığında, izinli blokzincirlere özgü güvenlik açıklarına dikkat çekmiş olsalar da (Okada, Yamasaki ve Bracamonte 2017), 'izinli blokzincirler' ulusal ve uluslararası kurumlar tarafından giderek daha fazla kullanılmaktadır. Dahası, analitik felsefe alanında yapılan nitel araştırmalar izinli yönetim sistemlerindeki mantıksal tutarsızlıklara işaret ederken (Parra Moyano 2017), siyaset bilimi alanında yapılan analizler de değiştirilemez bir kayıt tutma teknolojisi tarafından işletilen yönetim sistemlerinde güç rollerinin eşitsiz dağılımının risklerini vurgulamıştır (Dupont 2017; Franke 2020; A. J. Zwitter, Schulz ve Gstrein 2020). Bu nedenle, bu tezin üçüncü bölümünde, yeni 'izinler' protokolü, özerk olarak işleyen bilgisayar tabanlı bir yönetim sistemindeki kayıtların değişmezliğini sağlayan temel blokzinciri mimarisinin özellikleriyle ilişkili

olarak incelenecektir. Küresel yönetişimde izinli blokzinciri kullanımının bir örneği, 2017 yılında Suriyeli mültecilerin Birleşmiş Milletler Mülteciler Yüksek Komiserliği (UNHCR) tarafından sağlanan insan hakları korumasıdır. Bunu yapmak için UNHCR 2017 yılında, bireylerin biyometrik iris verilerini blokzincirinde depolanan verilerine özel anahtarlar olarak kodlayan IrisGuard adlı İngiliz merkezli biyometri şirketiyle ortaklık kurmuştur. Bu sayede, kimlik tespiti için irisleri taranan bireylere sorunsuz bir yardım ulaştırma süreci mümkün olmuştur. UNHCR, bu teknolojinin işlem ücretleri ve dolandırıcılık koruması ile ilgili finansal maliyetleri %98 oranında azalttığını açıklamaktadır. Bununla birlikte, blokzinciri ağına katılımlarının izne tabi olması nedeniyle, bireysel mülteciler kendi verilerinin depolanması ve kullanımı üzerinde yetkiye sahip değildir ve sistemden çıkma izinleri bile yoktur. Böyle bir uygulamada blokzinciri, yardım ve koruma arayan kişilerin kimliklerini, UNHCR'ın bile değil, IrisGuard şirketinin egemenliğini sürdürdüğü yönetilebilir bir sistem içinde yalnızca "mülteciler" olarak sunma işlevi görmektedir (Franke 2020). Bu bağlamda, bu tezin ikinci bölümü, "yönetimin öznelerini... yeni şekillerde, yetkin vatandaşlar olarak kabul edilenler ve edilmeyenler arasında yeni ayrımlar oluşturan bir faaliyet etiği açısından" belirlemenin içerdiği riskler açısından "izinleri" değişmez ve sağlam yönetim mekanizmalarına kodlamanın politik-teorik sonuçlarına odaklanmaktadır. (Rose 1996, 337) Bunu yapmak için, analitik felsefe ve siyaset teorisi perspektiflerinden 'izinli blokzincirleri' üzerine teorik analizler ve bilgisayar bilimlerinden ampirik çalışmalar, bu sistemlerdeki güvenlik açıklarına ve bireysel siyasi eylemlilik üzerindeki zararlı etkilerine rağmen küresel yönetim uygulamalarında kullanımlarını sorunsallaştırmak için sunulmaktadır. Bu bölümde ayrıca, 'izinli blokzincirleri' üzerine teorik araştırmaların, erken konuşlandırılmalarıyla değişmez etkiler yaratma riski taşıyan dijital teknolojiler tarafından desteklenen küresel bir yönetimselliğin ontolojik sonuçlarını ortaya çıkarabileceği savunulmaktadır. Bu nedenle, 'izinli' ve 'izinsiz çoğunluk' gibi yeni dijital kategoriler üzerine kavramsal analiz yapılması ve bu kavramların çağdaş siyaset teorisinde sunulan 'siyasal' kavramsallaştırmaları tarafından yeterince açıklanabilir olup olmadığının araştırılması önerilmektedir. Yönetimsellik yaklaşımında bu tür bir araştırma, blokzinciri teknolojisinin iktidara nasıl aracılık ettiği ve daha genel olarak, yeni teknolojiler kullanılarak eşitsiz bir karar

alma kapasitesinin nasıl üretildiği ve dayatıldığı konusunda değerli içgörüler sağlayacaktır.

'İzinli blokzincirlerinin' siyasi sonuçları bir yana, blokzincirinin şeffaflık, hesap verebilirlik ve değişmezlik özellikleri, bu teknolojinin mümkün kıldığı yönetim modelinin sunduğu meşruiyetin analizini de hak etmektedir. Yönetişimde blokzinciri kullanımına ilişkin ampirik vakalar üzerine yapılan analizler, hem blokzincirinin bireysel hak ve özgürlüklere ciddi ölçüde zarar verebileceğini, hem de siyaset teorisi ile bilgilendirilmiş aktif bir katılımı yeni modellerin geliştirilmesi ve uygulanmasının yıkıcı potansiyellere sahip olduğunu ima etmektedir. Blokzincirinden de eski bir teknoloji olan akıllı sözleşmeler de, dağınık defterin icadı ile artık "akıllı sözleşmeyi oluşturan kodun barındırıldığı ağın kendisi tarafından" yürütülmesini başlatmıştır (Wright 2021, 72). Blokzinciri ile birlikte kullanıldığında, akıllı sözleşmeler bir ağ programlanabilir hale getirir ve özerk olarak işleyen web uygulamalarının birden fazla bilgisayar tarafından beraberce yürütülmesine olanak tanır. Bir ağın tüm katılımcılar tarafından merkezi olmayan bir şekilde yönetilmesini mümkün kılan blokzinciri üzerinde çalıştırılan bu akıllı sözleşme uygulamalarına Merkezi Olmayan Uygulamalar (DApps) adı verilir. Genel olarak Web 3.0 olarak adlandırabileceğimiz bu araçlar, dünyanın dört bir yanından gönüllüler tarafından "insan işbirliği için yeni araçlarla çılgınca deneyler yaparak" kullanılırlar (Emmett 2019). Ortak bir kaygının gerçek paydaşları olarak farklı organizasyon yapılarını deneyen ve faaliyetlerini düzene koymak için merkezsiz uygulamaları kullanan bu tür gruplara Decentralized Autonomous Organizations (Merkezsiz Otonom Organizasyonlar), kısaca DAO'lar adı verilir. Bu gruplar, tüm ilgili taraflarca işbirlikçi ve kolektif bir şekilde önceden belirlenen faaliyetlerinin şart ve koşullarını saklamak için akıllı sözleşmeler kullanırlar. Bu şartların değiştirilmesi, çeşitli karar alma ve uygulama süreçlerini gerektirmekte, bunun için de tüm istekli üyelerin aktif katılımıyla dinamik olarak geliştirilen algoritmik çözümler ve protokoller topluluk üyelerinin kendilerinden başka kimsenin yetkisi ve rızası olmaksızın kolektif olarak yürütülmektedir. Böylece, 'izinli blokzincirlerden' sonra spektrumun diğer ucunda, DAO'ların yönetim yapılarında blokzincir ve akıllı sözleşme teknolojilerinin sağladığı alternatif tasarımların ve organizasyon yapılarının katılımcı inovasyonunu gözlemleyebiliriz. Bu bağlamda,

tezin ikinci bölümünün son kısmında, DAO'lar tarafından blokzinciri tabanlı yönetişimin alternatif kullanımları, kendi bileşenlerine karşı ayrımcılık yapmayan bir yönetim sisteminin oluşturulması ve sürdürülmesinde açık katılım ve devam eden işbirliğinin olumlu bir analizini desteklemek için sunulmaktadır.

Blokzinciri, merkezi olmayan ve dinamik karar almayı, önceden kararlaştırılmış kararların otomatik olarak uygulanmasını, ve bu süreci denetleyen insan temsilcilerine ihtiyaç duymadan emir ve sözleşmelerin düzenlenmesini mümkün kılan yeni bir "algoritmik güven" biçimi sunmaktadır. Matthew Ball'un Times dergisi için kaleme aldığı makalesinde belirttiği gibi, "(i)nternet, çok uluslu medya holdingleri tarafından araç satmak, reklam sunmak ya da kâr amacıyla kullanıcı verilerini toplamak için yaratılmış olmasaydı ne kadar farklı olacağını hayal etmek zor değil." (Ball 2022) Benzer şekilde, bu çalışmanın sunduğu hipotez, akademisyenler ve diğer araştırmacılar tarafından siyaset teorisi ile bilgilendirilmiş açık bir katılımı, DAO yönetim oluşumlarında demokrasi ve adalet teorilerinin kullanıldığı blokzinciri mimarileri tasarlamak ve bunları kolektif olarak uygulamak, demokrasi ve adalet arasındaki ikilemin üstesinden gelme potansiyeline sahiptir. Bu hipotezi desteklemek amacıyla çalışma, blokzinciri tabanlı DAO'ların, demokratik yönetişimin tesis edilebileceği en uygun örgütlenme biçimini hem teorik hem de ampirik olarak araştırmak için tekil bir kolektif çaba olgusu sunduğunu göstermek üzere nitel bir araştırma sunmaktadır. Analiz, blokzincirinin DAO'lar tarafından kullanımına yönelik olumlu bir yaklaşımı genişletmek amacıyla, blokzinciri temelli yönetişimin ne olduğunu değil, siyaset teorisi ile bilgilendirilmiş katılım yoluyla blokzinciri temelli yönetişimin ne olabileceğini sorgulamak için yeni materyalist araştırmalarda yaygın olarak kullanılan 'kırınımcı araştırma yaklaşımını' kullanmaktadır. Kırınım, iki farklı dalga kümesi birbiriyle karşılaştıklarında ve üst üste bindiklerinde, ve böylece başka türlü oluşmayan bir desen ortaya çıkardıklarında meydana gelen fiziksel bir olgudur. Fizikte, "kırınım aparatları" araştırmacılar tarafından uzun zamandır maddenin kırınım dışında gözlemlenemeyen tamamlayıcı davranışlarını gösteren 'etkileşim örüntülerini' (Young 1801) gözlemlenmek için kullanılmaktadır (Bohr 1996). Bu yaklaşımı kullanarak bu tezde, blokzincirinin özünde ne olduğu ya da belirli kullanımlarda neye dönüştüğü açısından değil, bu teknolojiyle teorik olarak bilgilendirilmiş bir şekilde

ilişki kurarak nelerin ortaya çıkarılabileceği açısından bir araştırma yapılması savunulmaktadır.

Analiz, DAO'ları Jean-Jacques Rousseau tarafından sunulan toplumsal sözleşme teorisi üzerinden okumakla başlamaktadır. 'Genel iradenin' kurucu yönü ve oluşumunun demokratik prosedürü, DAO oluşumları tarafından kullanılan blokzincirlerinin ve akıllı sözleşmelerin teknik özellikleri ile ilgili olarak tartışılmaktadır. Daha sonra, akıllı sözleşmelerin önemi ve bunları 'genel irade' terimleriyle kodlamak için bir araya gelen 'akıl' doğası ile ilgili olarak, John Rawls'un Kantçı 'akıl' anlayışını gerektiren 'adalet' anlayışı analize dahil edilmiştir. Kantçı 'akıl' yaklaşımı ve bunun 'politik olanı' oluşturan şeyle ilişkisi değerlendirilirken, DAO yönetim oluşumlarının Kant'ın 'sensus communis'i oluşturmak için tarif ettiği adımlar aracılığıyla 'genel irade' üzerinde uzlaşma sağladığı tespit edilmiştir. Bu durum, akıllı bir sözleşmeye dahil olan 'akıl', 'izinli blokzinciri' yapılarında olduğu gibi bireylere yönelik ayrımcılık riski taşıyan dışlayıcı bir 'engelsiz benlik' fikri açısından formüle edilip edilmediğinin incelenmesine olanak sağlamıştır. Analiz, Rawlsçu 'hakkaniyet olarak adalet' prosedürünün, tüm katılımcıların değişim şartlarını kabul ettiği blokzinciri ağı içinde 'sensus communis'in yeniden üretilmesine olanak tanıyan bir DAO yönetim yapısına yerleştirilebileceğini ve benzer şekilde Rousseau'nun 'genel irade' anlayışı doğrultusunda, akıllı sözleşmedeki bir değişikliğe katılmayan herhangi bir ağ üyesinin DAO'yu oluşturan kolektivitinin bir parçası olamayacağını ortaya koymaktadır. Bununla birlikte, blokzincirinin yapısı nedeniyle, yeni bir ağ yalnızca üyeleri için genellenebilir olan bir iradeyi üreten üyeler arasında kurulabilir ve bu kurulumun otonomisi engellenemez. Dolayısıyla blokzinciri teknolojisi, Chantal Mouffe ve Ernesto Laclau gibi yazarların savunduğu gibi, yeni özne konumlarının yaratılması yoluyla çoğulculuğu da mümkün kılmaktadır. Bu anlamda analiz, radikal demokrasi teorilerinin klasik toplumsal sözleşme teorileri ve modern öznenin çağdaş anlayışlarıyla birlikte, bir blokzinciri çalışmasında bir arada var olmasına da olanak tanımaktadır.

Son olarak, kamusal alanı neyin oluşturduğuna dair Arendtçi bir bakış açısı ve bunun 'Sokratik diyalog' yoluyla bir meseleye dair kişisel bir anlayışı başka bir kişiyle

ilişkilendiren şey olarak 'yargı' ile ilişkisi araştırılmıştır. Blokzinciri, herhangi bir görüşün, kişinin kişisel kimliğinden bağımsız olarak başkalarına görünmesi yoluyla kamuya açık hale gelmesine izin verdiğinden, DAO karar alma süreçleri dışlayıcı değildir ve kovuşturma, önyargı veya diğer zararlı maliyetleri riske atmadan, bireyin ya da bir görüşün görünürlüğe izin verir. Bu anlamda, Arendt'in Kant'ın 'yargı' kavramına yaklaşımı, siber uzayda sunulan herhangi bir görüşü, kendi bilincimizin işleyişini ve bunun ortak gerçekliğe dayattıklarına dair bir algıyı ortaya çıkarttığını düşünmemize yardımcı olur. Arendtçi analize göre, Kant'ın ikinci düsturu olan 'sensus communis'e, yani kendini ötekinin yerine koymaya olanak tanıyan şey, bu fikirlerin kamusal alanda özgürce değiş tokuş edilmesidir. Kendimizi ancak tanıdığımız, yani diğerleri arasında o kişi olarak tanıdığımız birinin yerine koyabileceğimiz için, o kişinin bizim için görünür olması gerekir. Arendt'in bir eylemin görünürlüğüne ve bunun kamusal alanın varlığına koşul oluşturduğuna dair yaptığı vurgu, 'yargının' ancak bu halde oluşabileceğinden gelir. Arendt'in ifadesiyle, "Kant'a göre yargı, yargılayan her bir kişi için geçerlidir, ancak cümledeki vurgu "yargılayan" üzerinedir; yargılamayanlar ya da yargı nesnelere görüldüğü kamusal alanın üyesi olmayanlar için geçerli değildir." (Arendt 2006, 217)

Bu çalışma bağlamında, DAO yönetim ağlarının Arendtçi okuması, görüşlerin ağdaki herkes tarafından gözlemlenebilmesi koşuluyla yaratılan 'kamusal alanın' çoğul tezahürünü mümkün kılması açısından, DAOların benzer istekler doğrultusunda bir araya gelen fikirlerin serbestçe değiş tokuşunu sağladığı, ve bunlara yönelik yaptırımların sadece 'kullanıcı otoritesi' tarafından yönetildiğini göstermektedir. Kısaca çalışma, Arendtçi anlamda, çoğulluğun insan eyleminin bir koşulu olduğunu, ve DAO yönetim oluşumlarının da insanın doğasına ya da birlikteliklerinin 'başlangıç konumuna' atıfta bulunmadan 'politik olanın' ne olduğunu anlama şansı sunduğunu öne sürmektedir. Bu anlamda DAO'lar, "insanların sadece başkalarıyla birlikte olduğu ve ne onlardan yana ne de onlara karşı olduğu saf insani birlikteliği" temsil etmektedir. (Arendt 1998, 180)

Sonuç olarak bu tez, DAO üyelerinin Web 3.0 aygıtı aracılığıyla, "hakkaniyet olarak adalet" prosedürünü takip eden müzakerelerle ulaşılan "genel irade" etrafında "ortak

dünya(lar)" inşa ettiğini iddia etmektedir. Çalışma, veri gizliliği gibi bireysel hakların, bir blokzinciri sistemi tarafından korunduğunda, merkezi olarak yönetilen sistemler tarafından korunmasına kıyasla önemli ölçüde daha az ihlal edilme olasılığı olduğunu göstermiştir. Bireyler, verilerinin merkezi sunucularda depolanmasına güvenmek zorunda olmamakla birlikte, ağda gerçekleşecek bir işlem için kurumsal üçüncü taraflara verilerini ifşa etmek zorunda da değildirler. Bu bağlamda, bilgisayar bilimleri ve analitik felsefe araştırmalarından destek alarak, izinli blokzinciri yapılarında bir konsorsiyum tarafından yönetilmenin zararlı etkilerinden kaçınmak için kamu hizmetlerinin, ulusal ve küresel insani yardım uygulamalarının, ve merkezi olmayan özerk kuruluşların yönetiminde orijinal (izinsiz) blokzincirinin kullanılması önerilmektedir. Bu açıdan, blokzinciri ağlarının oluşturulması ve yönetimine yönelik daha fazla katılım, işbirliği, akademik ilgi ve uygulamaya dayalı eylem araştırması yapılması gerekmektedir.

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