

The Rise of Collaborative Networks

A human-centric perspective on decentralized social scalability

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Significance This paper examines the potential of collaborative networks as a novel form of social organization that may be better suited to addressing the challenges of the 21st century. We argue that traditional hierarchical institutions and competitive markets may be insufficient to handle complexity and unpredictability sustainably. By offering counterexamples from Web2 and Web3 to support our claim, we investigate digital platforms and delve into the fundamental principles and processes that underlie collaborative networks, with the aim of shedding light on their unique features and potential benefits.

Abstract The information revolution has led to a systemic advantage for networked forms of social organization over traditional hierarchies (Ronfeldt, 1996). Web3 embodies this shift by aiming to satisfy the demand for a new pragmatic social functioning that avoids vertical command and control. This social and technological project aims to redesign social systems by replacing middlemen with middleware based on shared ownership, transparency, and decentralization. Web3 offers two main breakthroughs: first, decentralized social scalability, or the ability for an organization to scale while safeguarding large numbers of people from each other and the system itself, through a trust minimization strategy (Szabo, 2017); and, second, fusing competitive markets with collaborative communities through decentralized autonomous organizations or DAOs (Buterin, 2014). However, the never-ending quest for real-world use cases beyond financial applications illustrates a strong contradiction in this machine-centric approach. Instead, we offer a human-centric perspective to decentralized social scalability. This strategy would establish horizontal collaborative dynamics by using reciprocal exchange, shared interests, and distributed accountabilities at the micro level of the human experience, and a scale-independent architecture to maintain a continuum of trust and feedback loops up to the macro level of the social structure itself. This paper aims to spark a conversation about the rise of a fourth type of human organization, the collaborative network, which would operate between those of the tribe, the hierarchical institution, and the competitive market.

Keywords: collaborative networks, decentralized social scalability, social self-organization, distributed trust, community-owned networks, digital cooperatives.

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Foreword

We place our approach within the vision of Dee W. Hock, founder and CEO emeritus of Visa International, in which "chaordic organizations' harmoniously blend characteristics of both chaos and order, a distinctive property of the fundamental organizing principles of evolution and nature" (Hock, 2020). We also pay attention to the social scalability mechanisms elicited by Nick Szabo as Bitcoin's biggest breakthrough. "Social scalability is the ability of an institution [...] to overcome shortcomings in human minds that limit who or how many can successfully participate. [...] It's about human limitations, not about technological limitations or physical resource constraints" (Szabo, 2017). We also look at how social scalability mechanisms fit into David Ronfeldt's framework for how societies change over time. In this framework, there are four basic ways that societies are organized. These are the forms of the kinship-based tribe, the hierarchical institution, the competitive exchange market, and the collaborative network. One of the key propositions of the framework is that the information revolution systematically favors "network" forms of organization while it erodes traditional hierarchies (Ronfeldt, 1996).

The advancement of technology has brought about new ideas and approaches to social organization, one of which is Web3's decentralized approach. Despite the contrast between Web3's machine-centered strategy and our human-centered approach to decentralization, Web3's achievements and limitations serve as an inspiring source of discussion. The concept of decentralized social self-organization is vital for the evolution of future social organizations, and Web3's real-world implementation provides valuable insights into the practical aspects of such a system. Additionally, Web3's aim to combine the competitive market and collaborative network creates a unique opportunity to address the challenges facing society in a more holistic manner. With the increasing importance of information technology, finding answers to the issues posed by Web3 will likely be relevant for any future initiative in this field. The term "Web3" is used in this context to encompass the potential for a decentralized society that has yet to be fully realized. Because the initial conditions of a model have a strong influence, we intend to step back from the gadarene rush it spawned and reflect on its origin and evolution.

We are not from academia or the tech industry, we do not recognize ourselves as having definitive answers or specific expertise, and we hold negligible amounts of cryptocurrencies. We undertook this essay with limited prior knowledge about Web3 and navigating the technical intricacies and the obvious lack of impartial information was challenging. We thus slightly err on the side of caution to compensate for the absence of a balanced perspective on Web3 promises which do not always match reality. The purpose of this paper is threefold. First, to contextualize Web3 with a critical and crypto-sober approach from a civil society and end-user perspective. Second, to present new insights into the potential of decentralized social scalability mechanisms through trust relationships, which run counter to the "machine at the center" approach of Web3. Third, to spark a conversation about how these mechanisms could be applied to a new type of social organization, the collaborative network.

About us Meoh is a nonprofit research organization located in the heart of Brussels and devoted to improving human cooperation. MEOH is an acronym inspired by Dante's Divine Comedy, Paradise, Canto XIX: "from Many Embers One Heat is felt."

Significance

Complexity is a characteristic of the modern world, but hierarchical institutions struggle to respond to changing situations as they rely on a centralized and rigid structure. In contrast, the Internet and the growth of networks have eroded these hierarchies and made it possible for decentralized, polycentric and chaordic models to emerge. The systemic extraction of resources by competitive markets has led to a need for sustainable models that respect both people and the planet. The existing hierarchical institutions, competitive markets and addictive technologies have contributed to erode the trust, community, and social relationships that are essential for a healthy society. These challenges are interconnected in the sense that they all stem from the limitations of traditional hierarchical institutions, competitive markets, and social technologies in meeting the needs of the individuals they are meant to serve.

Therefore, there is room for a new type of social organization that is both agile and cooperative. This organization should allow for decentralization, self-organization, and respect for people and the planet. As human groupings become bigger, it becomes more difficult to prevent freeriding, which is why a model that is transparent, cooperative, and interdependent is needed. The digital transformation of society offers the potential for this new type of social organization to emerge, one that is better equipped to handle the complexities and uncertainties of the 21st century, one that is both agile and cooperative.

Collaborative networks and digital cooperatives are closely related concepts that can be used interchangeably. Collaborative networks refer to a decentralized network of individuals, organizations, and groups that are connected and working together towards a common goal or purpose. They are defined by principles of cooperation, collaboration, and decentralization, and are designed to be highly agile and adaptable. Digital cooperatives, on the other hand, are a specific type of collaborative network that are organized as democratic, member-owned and operated organizations. They are designed to provide a platform for people to work together in a cooperative and equitable manner, and leverage digital technology to facilitate collaboration, communication, and decision-making. ²

In essence, digital cooperatives are a subset of collaborative networks, as they embody all of the key principles and characteristics of collaborative networks, but are specifically structured as democratic, member-owned cooperatives. The relationship between collaborative networks and digital cooperatives is therefore one of structure and purpose. Both are based on the principles of cooperation, collaboration, and decentralization, and both leverage digital technology to facilitate collaboration and communication. However, digital cooperatives take this a step further by providing a specific organizational structure that is designed to promote democratic decision-making and equitable distribution of resources and benefits.

² Cooperatives are used for a variety of purposes and are primarily established as a way for individuals or groups to pool resources, knowledge, and skills to achieve common goals. Some of the most common uses of cooperatives include: agriculture, retail, finance, housing, energy and even stock exchanges such as NASDAQ OMX Nordic Exchange, Borsa Italiana and Wiener Börse.

1. Web3 and social scalability

Web3 is a catch-all term and vision for the next iteration of the Internet, one that is user-centric, built on blockchain technology, and incorporates concepts like decentralization and token-based economics. Web3's definition is still unclear, but it is assumed to include innovations like Bitcoin, other crypto assets and "alt-coins," blockchains, smart contracts, Decentralized Finance (DeFi), Decentralized Governance (DeGov), Non-Fungible Tokens (NFTs), Game Finance (GameFi), Decentralized Autonomous Organizations (DAOs), Decentralized Society (DeSoc), Soul Bound Tokens (SBTs), and arguably the metaverse. Web3 bills itself as the successor to the Web2 companies, in which rule-based software applications and community governance are designed to replicate social organizations. It occupies uncharted territory at the crossroads of numerous disciplines, such as computer science, cryptography, economics, politics, and law. Although the term "Web3" was coined in 2014 by Ethereum co-founder Gavin Wood, the blockchain, its foundational technology, was popularized in 2009 with the publication of the Bitcoin whitepaper. Initially, Bitcoin was framed as "a system for electronic transactions without relying on trust" (Nakamoto, 2009). The Bitcoin initiative arose as a result of a distrust of centralized institutions in the aftermath of the 2008 financial crisis, when governments bailed out banks' toxic assets with taxpayer money. The reaction to this crisis of trust in Big Government, Big Banks, and later Big Tech, which was also perceived to overstep its boundaries,³ was to transfer agency from the middlemen at the center of the system to the end-user at its edge. Providing a technological fix to a relational problem, the idea was to transition from the deceitful reliance on these inherently corrupt intermediaries to a "zero-trust interaction system [where] all interactions will be carried out pseudonymously, securely, and, for many services, trustlessly" (Wood, 2014).

Web3's mission, led by technologists and libertarians, is thus to use computer science to bypass human politics, corruption, and privilege and create a decentralized, egalitarian, and rational society. In that sense, Web3 is a technological innovation as well as a social project. However, its added societal value remains elusive, and many find it difficult to comprehend. Beyond the hype, the general public is turned off by the steep learning curve required to master the dense financial and technical jargon of decentralization as used by Web3 advocates. Because it openly challenges the status quo, proposes to reshuffle the cards of money and power and put people "in charge," Web3 has sparked heated debates across the ideological spectrum. Proponents of Web3 see the computer as a tool to liberate and protect people rather than control them. According to its detractors, Web3 is a feel-good story about community empowerment wrapped in predatory market tactics, or at the very least, a hollow abstraction in search of a problem.⁴ Detractors further argue that tokens are not magic beans that can solve social problems; supporters contend that the state of things is only transitory, the technology being still nascent.

Regardless, Web3 has grown, with some setbacks and in a relatively short span of time, from humble and obscure cypherpunk origins into a multi-trillion dollar industry.⁵ In the meantime, it

³ Facebook–Cambridge Analytica data scandal. In *Wikipedia*. Retrieved June 6, 2022, from https://en.wikipedia.org/wiki/Facebook%E2%80%93Cambridge_Analytica_data_scandal

⁴ Letter in Support of Responsible Fintech Policy. Retrieved June 1, 2022, from <https://concerned.tech/>

⁵ The total cryptocurrency market cap is \$0,835T at the time of writing (November 10, 2022), down from an all time high of \$2,904T on November 10, 2021.

attracted a lot of attention, money, and talent. Bitcoin, its flagship, has become mainstream in popular culture, being legal tender in some countries while being banned in others.⁶ DAOs, the governance vessels of Web3, are poised to spearhead a trend toward making transparency the default value of social organizations, based on a shared understanding that all participants can independently verify. And while the Internet and the Web changed human communication and interaction, it is hoped that Web3 has the potential to provide novel ways to enable people to work toward a common objective, given its ability to pool and deploy funds with streamlined improvement proposals and digital voting systems. DAOs are thus meant to engage in the value creation and influence of businesses and communities.

According to Nick Szabo, creator of “Bit Gold,”⁷ a direct precursor to the Bitcoin architecture, Bitcoin's main innovation is to enable social scalability through trust minimization. Social scalability is understood as the ability of a social structure, organization, network, or institution to successfully grow and handle an influx of participants while keeping them safe from each other and the social structure itself (Szabo, 2017). Since maintaining intimate human groupings necessitates substantial mental and emotional engagement in relationships, these mechanisms attempt to alleviate the need for people to invest scarce cognitive resources in worrying about the conduct of counterparties and third-parties alike. This cognitive limit to the ability to maintain personal relationships and make value judgments about the behaviors of others has been identified as the “Dunbar number,” which is around 150 people (Dunbar, 1992). Thus, above that number, “overcoming human cognitive limits to who or how many can participate in an institution [...] requires institutional and technological innovation [...] that moves function from mind to paper or mind to machine, lowering cognitive costs while increasing the value of information flowing between minds, reducing vulnerability and/or searching for and discovering new and mutually beneficial participants” (Szabo, 2017). Therefore, social scalability refers to the effort to overcome human limitations by offloading the cognitive complexity of managing social relationships onto the organization itself. Hence, “the king is dead, long live the king” reflects the idea that the organization must, by necessity, sustain itself over time in order to maintain its social function intact and avoid a power vacuum. In this essay, we seek to demonstrate that, by answering the call for a new pragmatic functioning that avoids recourse to vertical command and control, Web3 innovates with its attempt to provide social scalability in a decentralized way.

We locate our approach within David Ronfeldt's theoretical framework of societal evolution, which aims to explain the long-term transformation of societies through four sequentially fundamental types of social structures: the kinship-based tribe, the hierarchical institution, the competitive exchange market, and the collaborative network. “Tribes developed first, hierarchical institutions next, and competitive markets later. Now, collaborative networks appear to be on the rise as the next great form of organization to achieve maturity” (Ronfeldt, 1996, p.2). These various forms of societal organization are not substitutes for each other, but aptly complement one another. Following the framework, a critical element of the information revolution is that it systematically promotes “network” types of organizations while eroding and

⁶ Legality of cryptocurrency by country or territory. In *Wikipedia*. Retrieved September 1, 2022, from https://en.wikipedia.org/wiki/Legality_of_cryptocurrency_by_country_or_territory

⁷ Nick Szabo. In *Bitcoinwiki.org*. Retrieved date from https://en.bitcoinwiki.org/wiki/Nick_Szabo

disrupting traditional hierarchies. It also states that the latest form of social organization, the network, an “all-channel” design where all members are connected to and can communicate with each other, has been all pervasive in human society since the dawn of time and is more the “mother of all forms” than a specific, distinctive type of digital organization. Each form responds to a key problem that societies must face and resolve as they advance. The framework concludes that “we are entering a new phase of evolution in which societies [that combine all forms] will emerge and take the lead” (Ronfeldt, 1996, p.3).

Social scalability mechanisms vary according to how each type of social organization uses them to reduce uncertainties about the behavior of individuals while maintaining their social functions. The respect of traditions and ancestors channels the social energy within tribes and clans. In hierarchical models, the military enforces chains of command and control and institutionalizes violence; the church leverages its higher understanding of divinity while sharing moral values and fostering practical guidance for community structuring and cooperation; and the state operates with the rule of law and the judicial system. In systems such as the competitive market that are supposed to be self-regulated when left alone by the state, money, price, and trading rules play the regulating role by determining the conditions of exchange for transacting parties. “Money creates unified information spaces to which people adjust their thoughts and behavior” (Lietaer, 2001). Although the social scalability mechanisms of the competitive market, which presuppose the free and fair interaction of independent agents, may seem to contradict those of hierarchies that demand subservience, they have synergized to create a higher order of complexity and the conditions for a new social expression that has shifted from a feudal model to that of liberal democracies. In fact, “political democracy has been unable to exist except when coupled with the market” (Lindblom, 1977). While hierarchies compensate for a number of vulnerabilities, one of which is the difficulty of predicting complicated cycles of contingencies, markets solve the problems of increasingly complex economic exchanges and their interaction provides mutual benefits.

Today, though, this synergy seems to have reached its limit. In a new context ruled by global interdependence, great uncertainty, and resource scarcity, the need for permanent adaptability causes systemic harm to hierarchical institutions. They find it increasingly difficult to execute decision-making that can predict the best possible paths for future action. The fundamental drawback of the hierarchical structure is that it is incapable of handling dynamic information exchanges and flows. As an example, in the face of uncertainty, the military must relax tight control and “give commanders at all levels the latitude to act with initiative and boldness” (US Marine Corps, 2018, p. 3-6). And as society grows more intertwined, the distinct boundaries of hierarchical institutions become an issue as they can hardly remain immune to cross-cutting networks of influence. While social organizations need to become more agile, the prevalence of computer networks dictates that they also become “network-friendly.” In effect, legacy institutions become outdated as they rarely meet these characteristics. In contrast, competitive markets have no aversion to complexity. However, because they concentrate resources and are oblivious to the disparities and externalities they generate, such as social injustice and environmental destruction, they are fundamentally unsustainable if left unchecked. While the market acted as a liberating force from feudalism in a world of abundance, it has become, in a

world of scarcity and through economic activity, the vehicle for its restoration. The historical contingency of this dual model of the state and the market has to be questioned because social scalability strategies based on rigid control and resource extraction conflict with the necessary evolution towards a new societal paradigm that requires both adaptability and regenerative capacities. It seems that we are again at a turning point in history where social structures must reach a higher level of complexity. We think that the centralized hierarchical model of institutions and the decentralized and self-organized model of markets will soon be joined by a new heterarchical⁸ and self-organized model of collaborative networks. Coercion, competition, and cooperation might soon coexist to reflect how each organizational model handles connections of dependence, independence, and interdependence. Questioning social coordination is timely and Web3 is part of a megatrend by openly entering the preserve of centralized political and economic organizations with one simple law, which is code.

1.1 DeFi: Minimizing trust

In contrast to centralized institutions, Web3 innovates with a perspective on social coordination that "kills the middlemen" and replaces them with "middleware." Its bespoke decentralized social scalability mechanism brings the idea of self-organization to the fore. The primary goal of Web3 in enabling decentralized social scalability is to coordinate a large number of people while avoiding centralized oversight and the ponderosity of hierarchical structures. To our knowledge, this is humanity's first attempt to facilitate large-scale social coordination in a decentralized manner, which is remarkable in its own right. Bitcoin innovates with decentralized social scalability with a consensus mechanism that ensures the integrity of information flows in the blockchain, executes decision-making by code, and anchors relationships in game theory principles, which assumes that participants will act as independent and competing agents, thus reducing the need for trust. Game theory is the study of strategies that identify the optimal course of action for individuals to adopt in order to attain a desired outcome. It is also a mathematical model of human behavior that supports the consensus mechanism of blockchain technology by encouraging rational agents to ensure the integrity of distributed databases with financial incentives. Thus, a machine-centric model applied to decentralized social coordination incentivizes people not to cooperate even when it is in their best interests to do so and may originate from the notion that network security is the coordinating factor that matters the most.⁹ Then, with a machine-based consensus tied by financial interests, social interactions are bound to become a byproduct of market dynamics rooted in competition, and individuals driven by the rational calculation of their own gains are anticipated to systematically profit at the expense of others.

The trust minimization strategy contains other inherent restrictions. Decentralized automated integrity comes at the expense of performance, an unavoidable tradeoff in computer science and a particularly sore point for the blockchain trilemma, which is a concept for the difficulty of

⁸ Heterarchy, form of management or rule in which any unit can govern or be governed by others, depending on circumstances, and, hence, no one unit dominates the rest. In *Britannica*. Retrieved November 1, 2022.

⁹ Prisoner's dilemma. In *Wikipedia*. Retrieved June 7, 2022, from https://en.wikipedia.org/wiki/Prisoner%27s_dilemma

achieving decentralization, security, and scalability at the same time (Certik, 2019). Because the system cannot compromise its security, decentralization must be sacrificed in order to achieve technical scalability. Furthermore, complete "trustlessness" is impossible because human intermediation cannot be skipped entirely. Indeed, "the ideal of a decentralized autonomous organization is easy to describe: it is an entity that lives on the internet and exists autonomously, but also heavily relies on hiring individuals to perform certain tasks that the automaton itself cannot do" (Buterin, 2014). Debating proposals, conducting votes, and deploying code are examples of human input in the system. The paradox is that middlemen, who are essential to the success of the system, are basically not accounted for.

Like centralized institutions, Web3 is fundamentally designed with impersonal relationships in mind but takes the logic even further, aiming at pure trustlessness. Trust, which is essential to the human experience, is perceived as a point of failure and, thus, as an unwanted attribute of the system. Indeed, when framed within the context of impersonal relationships, trust equals risk, and minimizing risk equals minimizing trust. Thus, like centralized institutions, Web3 takes a risk-averse approach to trust, and trust minimization becomes the legitimate outcome of social interaction. However, this is a hurdle for Web3 as it needs to integrate human stewardship into the system. "Like organisms, the ability of a blockchain to succeed over time is based on its ability to evolve. This evolution will bring about many decisions on direction, and it is the governance around those decisions which most strongly determines the outcome of the system. If programming in the system is important, the metaprogramming of the system itself is most important" (Erdemi, 2018).

Web3 actualizes this metaprogramming with DAOs, online communities that jointly control a cryptocurrency wallet to pursue common goals. In practice, DAOs encounter certain challenges. Because they are token-gated and because tokens come at a financial cost, in the absence of a clearly defined purpose, the price of the native token is likely to become the primary driver of the DAO's justification. The majority of people's willingness to hold any given token has been shown to be based on their belief in its ability to outperform other assets (Jefferys, 2022). While Web3 is filled with creative communities that have a genuine interest in building a better Web, it also attracts digital alchemists mired in the power of creating money out of code without real utility or intrinsic value. Because crypto projects can bring life-changing money, people flock to the hype, and some promoters do not hesitate to foster a cult-like mindset expressed through crypto-jargon to suppress healthy criticism, create in-group and out-group dynamics, and entice the "greater fools" into "aligning incentives" with founders and early adopters. Thus, Web3 ventures into social interactions with the tokenization of communities, a social space that had previously evaded the market's dynamics. This is a key element because it sets a precedent that links the market and the community, the only two forms of social organizations that are network-friendly.

Self-regulating economic structures are politically attractive to many, and even those who are critical of the capitalistic model of Web3 cannot resist the urge to monetize relationships that

were once the realm of the non-market economy.¹⁰ With social interactions heavily influenced by economic transactions, DAOs exhibit contrasting behaviors. The absence of a reputational penalty for pseudonymous individuals creates a favorable climate for freeriding. In DAOs, decision-making is correlated with token ownership; therefore, wealth equals power, and "they who have the money make the rules," incentivizing DAO members to align their economic interests with those of "whales," or large token holders, aiding in a Pareto distribution of influence. While the future social organizations will likely be based on online communities and while we praise the transparency and community governance of DAOs, Web3's emphasis on the automation and commoditization of relationships makes it a peculiar social ideal.

Decentralized social scalability without supervision seems impossible, since people's goals and intentions can be different, if not outright opposites. As a way to predict how people will act, it seems reasonable at first to bet on the tendency of "rational" people, especially strangers, to put their own interests ahead of everything else, then use game theory to tokenize interactions and give people incentives to act in certain ways. Likewise, legacy institutions have their own mechanisms to minimize the need for trust, yet they cannot do without trust, hence the reliance on the proverbial "middlemen." In fact, Web3 also relies on intermediaries and has not, since its inception, escaped the vicissitudes of trusting them: "Bitcoin was designed to rely on a decentralized, trustless network of anonymous actors, but its early success rested on cooperation among a small group of altruistic agents" (Aiden, 2022, p.6). So, how to create a trusted relationship with these new and potentially unknown intermediaries? How to avoid having communities turned into arenas where participants are assumed to be mutually antagonistic or at least maximizing their own profits? More generally, how to trust in a trustless environment?¹¹ And, so far, the conundrum is that we cannot, but we must.

1.2 DeSoc: Encoding trust

DeSoc, or decentralized society, is a new initiative that aims to provide Web3 with a native identity by encoding the trust networks of the real economy. "Rather than build on DeFi's trustless premise, DeSoc encodes trust networks" (Weyl et al., 2022, p. 18). It does so by relying on peer-to-peer social attestations to represent social identity, provenance, and reputation. Its purpose is to overcome the current dependence on Web2 infrastructures, such as the need for NFT artists to rely on centralized platforms for provenance; for DAOs to rely on social media profiles for sybil resistance; and for users to rely on custodial wallet management for convenience. DeSoc also aims to skirt hyper-financialization by encoding rich social and economic relationships to alleviate the "long-standing problems in Web3 around wealth concentration and the vulnerability of governance to financial attacks, while spurring a 'Cambrian explosion' of innovative political, economic, and social applications" (Weyl et al., 2022, p.1). The key primitives of DeSoc are "Souls" accounts or wallets and "Soulbound Tokens" (SBTs), which are publicly visible but non-transferable tokens that show commitments,

¹⁰ Disco Coop Manifesto and Elements. Retrieved April 1, 2022, from <https://disco.coop/manifesto/>, <https://elements.disco.coop/>

¹¹ "It is not that the individuals have no trust, or are trustless, but rather that they have both entrusted the software system, and the community of developers and all participants in that ecosystem (core developer, miner, holder, exchanges, wallet developers etc) to act in the manner advertised" (Grigg et al., 2022).

credentials, and affiliations. SBTs can be self-certified or attested by other Souls, allowing peer-to-peer counterparty validation. By "embedding security in sociality," community wallet recovery; community lending practices; Sybil-resistant governance; mechanisms to maintain the decentralization of the network; establishing provenance and scarcity of objects; plural sensemaking between artificial intelligence and prediction markets; plural property; novel markets with shared decomposable rights; and bottom-up alternatives to social credit systems are anticipated applications of DeSoc. DeSoc intends to provide Web3 with innovations and a new orientation that avoids the "Charybdis of private rent extraction and the Scylla of public regulatory capture" (Weyl et al., 2022, p.17). In other words, "DeSoc transforms DeFi's race to control and speculate on the value of networks into a bottom-up coordination to build, participate, and govern them" (Weyl et al., 2022, p.17).

DeFi's trust minimization strategy lacks a way of overcoming implicit centralization through collusion and market power with either its consensus mechanisms or its token-weighted governance systems. However, it provides a set of rewards, i.e., incentives and punishments, for its users who are assumed to be rational, meaning that they are predicted to keep maximizing their own self-interest. "The core of Proof of Stake relies on the simple idea that one would not devalue the assets one owns" (Motepalli and Jacobsen, 2021, p.2). Thus, DeFi still provides reasonable expectations about the potential behaviors of others. Unlike the DeFi approach, which incorporates social scalability into financial capital, where trying to game the system may result in financial loss, SBTs take into account the social context by incorporating social scalability into provenance and reputation, which may instead affect social capital. However, DeSoc does not seem to provide strong behavioral incentives other than attempting to encode the trust networks of the real economy. Thus, DeSoc remains exposed to off-chain collusion, side-channel coordination, and cheating by users who might misrepresent their social identity. "Just as DAOs can be bribed, so can Souls and the on-chain voting mechanisms which they use" (Weyl et al., 2022, p. 23). In reality, there is no way to determine whether SBTs reflect true social engagement or how souls choose to play the game, which can undermine trust in the system. "The problem of gaming should not be understated. It is a significant issue and resolving it is one of the most important foci for future research" (Weyl et al., 2022, p. 23).

2. Drawbacks of the machine-centric approach

Sometimes portrayed as a rebranding of crypto-assets and blockchains, Web3 is a complex reality that incorporates rival worldviews competing within its own ecosystem. "Bitcoin's largest long-standing danger is not central banks or government bodies; it is the technological know-how behind Bitcoin that anyone can use to launch new cryptocurrencies" (Balaban, 2017). However, the premise of social scalability mechanisms rooted in decentralization, trustlessness, and immutability are shared by all Web3 factions, and its name implies that it aims to have a wide-ranging social influence, initiating a shift from an "internet of information" to an "internet of value" (Tapscott, 2022). "Web3 aspires to transform societies broadly, rather than merely financial systems" (Weyl et al., 2022, p. 16). Because a system's early marks and conditions have a strong and long-lasting effect, we try to learn more about how it came to be and catch some of its undercurrents. Following a crisis of accountability and information asymmetry about

the collusion of private and public actors during the 2008 financial crisis and about breaches of data privacy by tech giants and state actors (NWC, 2021), the general agreement in the Web3 community is that the “man in the middle” is not trustworthy and that centralization is an undesirable attribute of social systems. Web3 is an attempt to redesign human organizations based on computer science with the core value of mistrust and the principles of decentralization, radical transparency, co-ownership, and censorship-resistance. “I think this is the first time we're trying a decentralized, non-trust-based system” (Nakamoto, 2009).

The introduction of decentralized social scalability mechanisms through a trust minimization method enabled by a "machine at the center" approach and the merging of the market and the community through its DAOs are, in our opinion, its two most significant developments. Web3 thus understands the community as a self-organized market, with the human coordination layer of DAOs being "coin-weighted." To align interests, DAO members have a collective incentive to contribute to the stability or the increase of value of the DAO token but still have an individual incentive to sell the token for a profit, which has the effect of depreciating its value. Community logic somehow needs to get the upper hand on market logic because ultimately “the strength and size of the community determines how much value a cryptocurrency captures.” (Tomaino, 2018). This human layer helps social scalability with improvement proposals, better collective sensemaking, and streamlined digital voting. However, Web3 communities run on decentralized infrastructure, whose consensus mechanisms function as self-regulating systems rooted in game theory and driven by competition among atomized actors. Thus, with social atomization being a prerequisite for perfect competition, social relations and the strength of the community become a frictional drag that impedes its decentralized competitive markets. This "machine at the center" approach is driven by ideological beliefs that pose significant challenges that make it difficult to protect users from one another or from the system itself, which might ultimately hinder the development of a robust decentralized social scalability.

2.1 Technical drawbacks

On the technical side, blockchains are a type of distributed ledger technology consisting of growing lists of entries called *blocks* that are cryptographically linked together with *chains*. They promise enhanced security, greater transparency, instant traceability, increased efficiency, speed, and automation (IBM, 2022). Because of its math-based coordination, it is supposedly impervious to third-party abuses and control. A great deal of the blockchain’s appeal might come not from the technology itself but from “its supposed capacity to modify economic organization so as to transform the dominant power relations” (Lehdonvirta, 2016). Due to the blockchain trilemma, the machine-at-the-center approach cannot provide a system that is secure, decentralized, and scalable at the same time. And though the system becomes more secure as it grows, recording transactions becomes slower and more expensive. “In a good monetary system, the greater the number of users, the lower the cost of transactions, and so the greater its utility. But, as more people use a cryptocurrency, the greater the congestion and the more costly the transactions. This is because self-interested validators are responsible for recording transactions on the blockchain. The latter must be motivated by monetary rewards high enough to sustain the system of decentralized consensus. The way to reward validators is to limit the capacity of the blockchain and keep fees high. So, rather than the familiar monetary

narrative of ‘the more the merrier’, crypto displays the property of ‘the more the sorrier’” (Wolf, 2022). That tension between decentralization and scalability also creates the paradox that the more decentralized Web3 becomes, the need for coordination increases. However, "given the objective limit of a 51% hashrate attack to some important security goals of public blockchains like Bitcoin and Ethereum, we do care about the distinct identity of the most powerful miners to answer the question ‘Can someone convince and coordinate the 51%?’ The security of a blockchain is limited, and the possibility of a 51% attack has a big impact on how the blockchain is run. An attack, of course, does not have to be called an ‘attack’ by the attackers; instead they might call it ‘enlightened governance’ or ‘democracy in action’” (Szabo, 2017).

Because append-only distributed ledgers that cannot be updated produce additional rigidity, immutability, a defining property of blockchains, might have a negative impact on social scalability. “[...] they try to build trust by making their code immutable as an entry in a blockchain and therefore unpatchable” (Hamiel, cited in Pegoraro, 2022). It is unfortunately not too difficult to imagine how hate speech and immutability can also be weaponized as a new form of attack and harassment (Lutz, 2022). This weakness is further exacerbated by smart contracts, which are susceptible to human error and exploitation because of possible flaws in the design of their governance rules or mechanisms in which an attacker exploits the code or obtains legitimate voting power, like with flash loans or by buying tokens on the open market. The complexity of smart contracts expands the risk surface and thus provides many attack vectors. "The Web3 and cryptocurrency space is seeing a significant amount of smart contract scams proliferating, with blockchain risk monitoring firm Solidus Labs saying it has detected on average 15 newly deployed scams every hour" (Coghlan, 2022).

Furthermore, “When people talk about blockchains [...] they talk about distributed trust, leaderless consensus and all the mechanics of how that works, but often gloss over the reality that clients ultimately can’t participate in those mechanics. All the network diagrams are of servers, the trust model is between servers, everything is about servers. Blockchains are designed to be a network of peers, but not designed such that it’s really possible for your mobile device or your browser to be one of those peers” (Marlinspike, 2022). To ease user interaction and to keep costs down, Web3 is still forced to rely on Web2 infrastructures. “More customers trust AWS for their blockchain and ledger technology workloads than any other cloud vendor” (Amazon, 2022). Thus, by aiming at scalability, Web3 is losing the decentralization but is keeping the complexity which makes Tim Berners-Lee, the “Father of the World Wide Web,” critical of the technology as “he doesn’t view blockchain as a viable solution for building the next iteration of the internet” (Browne, 2022). Overall, the poor technical scalability of Web3 might be its biggest hindrance to its decentralized social scalability potential.

2.2 Societal drawbacks

On a societal level, Web3 is part of the evolution of the Web from "read" (Web1) to "write" (Web2) to "own" (Web3), with the promise of verifiable digital ownership of services and assets for a creator-driven economy that prioritizes community interests over gatekeeper interests. We believe that this megatrend will only gain momentum over time. However, Web3 presents many challenges, some of them new, such as the commoditization of relationships and the complexity

of its smart contracts, which systematically put average end users at the mercy of exploits. It also amplifies existing ones like environmental issues and economic disparities because, stemming from an anarcho-capitalist project, it sidelines environmental and social concerns. The Web3 ecosystem, which is based on the crypto wallet as user identifier, however, embeds social ties in a market dynamic and currently does not provide social outcomes other than the possibility to generate income, which is offset by a flood of scams. Token-weighted governance leads to hostile takeovers that are entirely in line with the rules of the DAOs. Beyond offering a large attack surface, a system in which votes are transactable is fundamentally not democratic. “The point is that asset-weighted voting isn’t the ideal means for decentralized governance systems, especially if they seek to replace legacy models” (Ivanov, 2022). And this limitation also naturally arises in more general terms: “If we want our DAOs to be more than group chats with bank accounts, we need to know enough about one another to solve more interesting coordination problems than treasury allocation. So, if we want to, you know, write a song together, we have to know which one of us knows how to write music! Because a song that’s designed by the richest people in the room might not sound like a great song” (Evin McMullen, interviewed by Mann and Condon, cited in White, 2022).

The crypto wallet being a defining feature of Web3, it allows users to “participate without revealing every aspect of their identity leads to social structures that can inherently remove potential biases around gender, ethnicity, socio-economic status, sexual orientation, nationality, and other personal identifiers” (Chainlink, 2022). However, what happens when users lose their credentials? “The maxim of ‘not your keys, not your crypto’ is well known in the crypto space” (DCTA Editors, 2022). It also leads to the tokenization of everything. “The x-to-earn paradigm shapes GameFi’s new future, and it may alter the way we work, play, socialize, create, and learn” (Jia, 2022). While proponents see how such a paradigm could “equip the blockchain gaming sector with key insights, education, and tools to build the games and communities of tomorrow” (Irwin, 2022), critics point out its potential abuses and the mix of radical transparency and pseudonymity can have some corner use cases that are beneficial but are also potentially dystopian in nature. “With the cheap labor of a developing country, you could use people in the Philippines as NPCs (non-playable characters), real-life NPCs in your game” (Irwin, 2022).

Also, “differences in prices for digital avatars based on race, gender, and skin color are emerging among a popular collection of NFTs known as CryptoPunks, belying the utopian and egalitarian ideals touted by the closely connected world of crypto, decentralized finance, blockchain, and non-fungible tokens” (Egkolfopoulou and Gardner, 2021). The vision of the “machine-at-the-center” and of the “human-at-the-edge” of the system, the complexity of smart contracts and the stress of being at the mercy of exploits and technicalities (Coghlan, 2022), the volatile and at times exorbitant transactions fees for interacting with the blockchain (Anissimov, 2022), or the cost of operating a node ¹² will make the average user feel as though they were never actually considered. The reliance of Web3 on blockchains creates distortions where intermediaries are explicitly excluded but implicitly needed, where coordination sometimes equals collusion, and where acts of kindness can never be really trusted for what they are

¹² “Given the ETH price of \$1300.15 USD, the value of your original stake would be worth \$43,236 after 1 year and \$57,914 after 10 years.” Retrieved October 20, 2022, from <https://ethereumprice.org/staking/>

because they might just be instrumentalized to boost SBTs and a social credit score. Users don't have effective means to be protected from one another in this environment. "When that trust turns out to be misplaced, there is no recourse" (Schneier, 2029). This seriously harms Web3's potential to scale socially.

2.3 Financial drawbacks

On the financial side, and born as a reaction to the "irrational exuberance" of the monetary system, the stability of the crypto economy has not proved to be quintessential. "The recent turmoil in crypto-asset markets highlights their intrinsic volatility, structural vulnerabilities, and the issue of their increasing interconnectedness with the traditional financial system" (Financial Stability Board, 2022). Decentralized finance makes the headlines for their speculative and ponzi schemes, despite the fact that it arose as a counterpoint to a financial system that was criticized for being disconnected from the real economy (Trivedi, 2022). The crypto economy was supposed to be a hedge against inflation, but instead "mirrors and magnifies the fragilities of shadow banking innovations that resulted in the crisis of 2008" (Warzel, 2022). Bitcoin was initially conceived as a medium of exchange with mitigated results (DeCambre, 2021). "I've been working on a new electronic cash system that's fully peer-to-peer, with no trusted third party" (Nakamoto, 2008). It was later being repurposed as a store of value or "digital gold." In the case where Bitcoin becomes legal tender, these two functions do not appear to be satisfied. For the means of exchange, "overall, despite the legal tender status of bitcoin and the large incentives implemented by the government, the cryptocurrency is largely not an accepted medium of exchange in El Salvador" (Alvarez et al., 2022, p. 3). For the store of value, its stability has been more mercurial than proverbial as "there are large risks associated with using Bitcoin as legal tender, especially given the high volatility of its price" (IMF El Salvador country team, 2022). Ironically, the crypto economy, which was also created to free people from authoritarian regimes and the central banking systems' alleged tyranny, is now being embraced by such regimes (Amick, 2022).

It remains unclear if crypto assets are collectibles, stores of value, mediums of exchange, or units of account. Some commentators argue that "crypto assets are investment contracts, and they clearly meet the Howey Test for securities and fall under the remit of the SEC" (Diehl, 2022). In fact, regulators are undecided as to whether to classify them as securities or commodities. "It's a pretty cynical view to suggest two agencies can't figure it out and work together" (Benham, cited in Schwartz, 2022). With enhanced security, stability, and convenience, and maybe with universal basic income (UBI) as a selling feature, central banks digital currencies might compete with, replace, and even outlaw the current crypto assets and stablecoins that have been driving their development. "The Central Bank of the United Arab Emirates (CBUAE) said on Wednesday it has completed the world's largest pilot of central bank digital currencies (CBDC) transactions, with other regulators including the People's Bank of China's Digital Currency Institute" (Saba, 2022). CBDCs will drive innovations in programmable money experiments and allow central banks to "express their policy objectives," with privacy being the most problematic criterion (Andersen, 2022), and with targeted incentives to nudge consumers "down the broccoli aisle" (Lagarde, 2021).

Furthermore, “the prevalence of stablecoins, which attempt to peg their value to the US dollar or other conventional currencies, indicates the pervasive need in the crypto sector to piggyback on the credibility provided by the unit of account issued by the central bank. In this sense, stablecoins are the manifestation of crypto’s search for a nominal anchor.” (BIS, 2022). While championing decentralization and trustlessness, Web3’s market capitalization is still expressed in centralized fiat currencies whose value are solely based on faith, and thus, on the trust in central authorities. The relationship between crypto and fiat currencies dates from its inception. “Bitcoin did not fundamentally change as a piece of software when it first developed a price; the only thing that changed was people’s willingness to trade dollars for it” (Krawisz, 2016). However, now that the field entered a bearish period, for maximalists, “one bitcoin equals one bitcoin becomes the narrative as the drop gets ‘too painful’” (Hajric, 2022). In our perspective, the inherent volatility of crypto assets does not effectively protect Web3 users from the system, resulting in a low social scalability potential.

2.4 Legal drawbacks

On the legal side, Web3 proponents argue that, being jurisdiction-free and leaderless, blockchain technology is impervious to control or suppression. Yet, it is to see if technological accountability replaces legal accountability as it raises concerns from institutional actors (Krishnan, 2020). “By treating autonomous code as a ‘person’ OFAC (Treasury Department’s Office of Foreign Assets Control) exceeds its statutory authority” (Brito & Van Valkenburgh, 2022). Some people argue that Web3’s governance is not immune from legislation and is more of a social construct than a legal one. “The closest legal designation to a DAO is an unincorporated association or general partnership, which creates unlimited legal responsibility for all associates, partners, or the association itself” (Wiener, cited in *The Ownership Economy*, 2022). Crypto ventures might even be subject to retroactive legislation as with the high-profile case of Terra-Luna. “Whether Luna is subject to securities law is a key issue in the case and echoes a wider question officials globally are asking about the status of digital tokens” (Cha & Shukla, 2022). Even by avoiding setting up any legal entity at all and trying to create a fully decentralized structure, the prospective adoption of the “nearest person theory” might ensure that liability is enforced at every choke point (Roumpos, 2020). Especially, “regulators see points of control as strings to follow to the marionettist. [...] Technical control is at the heart of Web3 exploits because it (a) presents centralized points of failure and thus an attractive attack vector in decentralized systems and (b) exists to allow a protocol to swiftly respond to emergencies. The responses to these attacks make an easy case for regulators to demonstrate technical control and, thus, identifiable operators of the protocol” (Kappos et al., 2022). Also, public statements, marketing, and active participation in a DAO are seen as a form of business control, which have the potential to engage participants’ legal liability.

If the gavel of justice arguably hits from above, the arm of regulation always strikes from the center. More and more, regulators are becoming increasingly stringent as policies across the board tighten (Elliott, 2022). The influence of centralized powers is gaining momentum and self restriction is bound to spread across the crypto economy. “The Ethereum blockchain reached a new censorship milestone Friday when 51% of the blocks produced over the last 24 hours followed the U.S. Treasury Department’s Office of Foreign Assets Control (OFAC) compliance

recommendations” (Nijkerk, 2022). Also, “AllianceBlock has always stood for the advancement of an open, permissionless, and decentralized ecosystem. However, we recognize that effectively bridging the gap between DeFi and traditional finance requires a pragmatic and adaptable approach to compliance that can meet the needs of a diverse range of industry participants, including institutions and enterprises that are required to abide by anti-money laundering regulations” (AllianceBlock, 2022). Although regulatory pressure reduces uncertainty and increases the potential for social scalability, it negates the goal of utilizing blockchains for decentralization and censorship resistance. We may speculate that what is threatening to central authorities will be under control as “state regulation increasingly appears to be the price the crypto community will have to pay for assimilation into the mainstream economy. It raises questions about the direction of the industry, in particular, whether decentralization as a tool for resisting censorship is a myth” (Gogo, 2022). What is useful might be absorbed as legacy actors are looking to establish a “single gateway for fiat, CBDCs, and tokenized assets to ease cross-border payments and avoid causing disruption” (Swift, 2022). And what is harmless such as meme coins could be tolerated but left under the legal responsibility of those who partake in the adventure (U.S. Securities and Exchange Commission, 2022).

2.5 Methodological drawbacks

On the methodological side, Web3's tech-focused approach that pursues web2's mindset of going fast and breaking things does not inquire about the desires of society. Tools precede requirements, and solutions come before problems. Touted as the next iteration of the social web, Web3's non multi-stakeholder approach is baffling. Why is society at large not included in the definition of this next web? Is the next great human organization being built behind the closed doors of financial and technical complexities with the premise that in the digital age venture capitalists and computer scientists have higher understanding? “If we are to preserve a truly open, global internet that works for people, sparks innovation and helps us to collectively tackle the many challenges we face, we must act now to build globally accepted norms to shape the digital future we want” (Berners-Lee, 2021). From institutions to corporations, the trend is to include society at large. “The IGF (Internet Governance Platform) is a global multistakeholder platform that facilitates the discussion of public policy issues pertaining to the Internet” (IGF, 2022). Even within the monetary industry, “The consultation paper is aimed at fostering a broad and transparent public dialogue regarding the potential benefits and risks of CBDC” (Mangudya, 2022). Though it runs experiments on a scale that was not possible before, Web3 consistently emphasizes technological solutions, which is detrimental to the consolidation of a robust multistakeholder approach to decentralized social scalability.

2.6 Ideological drawbacks

On the ideological side, Bitcoin, and by extension Web3, provide a technological answer to the social issue of distrust.¹³ It is thus impervious to human behavior and aspirations. Based on the

¹³ It is generally assumed that Bitcoin was created as a reaction to a breach of trust in the central banking system capable of printing at will. “The root problem with conventional currency is all the trust that's required to make it work” (Nakamoto, 2009). See also, Genesis block. In *Bitcoin.it*. Retrieved August 14, 2022, from https://en.bitcoin.it/wiki/Genesis_block

belief that humans are fundamentally prone to deception, they should be pushed to the edge of the system as much as possible, and their interactions reduced to mere entries in a database. We believe that this is the most defining characteristic and the greatest constraint of Web3 because, as far as we know, technology does not solve social problems. This technological solution remains relevant as long as it is limited to economic transactions. But because human input and social coordination cannot be avoided and because blockchains are becoming more than just a way to mitigate simple financial transactions, they are poised to create lock-in effects in which automated systems designed to minimize trust dominate social relationships. The fact that a machine-centric approach is at the heart of the Web3 ecosystem may not seem like a big deal, but it raises a number of legitimate concerns about its future as a collaborative network. In effect, Web3 does not emerge as much as a response to societal needs as a reaction to its ideological imprints. However, though the pace of progress in artificial intelligence research is nothing short of amazing, it is also becoming increasingly difficult to understand (Yampolskiy, 2019). “Philosophical imperatives and political mechanisms from a bygone era (from basic morality to voting and from legal to regulatory systems) might matter little in the future. Most university programs and centers to integrate human concerns into the AI enterprise will show themselves as mostly window dressing” (Daneke, 2020). Thus, it might be time to ask who wants to forgo their free will in a future where “basic societal constraints” such as humans’ behaviors are seen as “impurities in the system” and must be subdued to or “supervised” by the “unassailable logic” and inordinate power of machines that are already seen by some in the Web3 ecosystem as the “Holy Grail ” of human intermediation.

Decentralization, the answer to the lack of trust in central authorities, is synonymous with Web3. Decentralization is technically a means to an end, but because of its ideological antagonism to centralization, Web3 makes it a political statement and an end in itself. On the upside, decentralization brings additional resilience, which is a desirable characteristic for increasing sustainability (Ulanowicz, 2009). However, on the other hand, it can be slow and ineffective, which is a problem in a society that needs to be able to adapt quickly. “The difficulty is that decentralization frequently generates inefficiencies that prevent DAOs from acting in a timely manner, such as restricting their capacity to capitalize on real-time opportunities or quickly repair unforeseen vulnerabilities” (Chainlink, 2022). Being anti-agile, increasing social inequities, and always being caught in a trade-off between security and scalability makes it unclear where decentralization’s particular value lies. For instance, how might decentralized organizations handle global pandemics instead of centralized ones? Can some degree of decentralization help centralized authorities broaden the scope of their responses? Wouldn’t society better desire a synthesis that balances the advantages and disadvantages of centralization and decentralization?

2.7 Governance drawbacks

In terms of governance, Web3 meets a paradox. Blockchains were created with the intention of eschewing human governance to the favor of automation. “The secret to Bitcoin’s success is that its prolific resource consumption and poor computational scalability are buying something even more valuable: social scalability” (Szabo, 2017). And as far as human intervention is concerned, the general belief is that core developers, “like neurosurgeons, won’t poke around

unless absolutely necessary” (Corem, 2015). However, if the network enforces the rules, “who makes the rules matters at least as much as who enforces them.” And, “whether they recognise it or not, they face the same governance issues as conventional third-party enforcers” (Lehdonvirta, 2016). Consequently, blockchains must incorporate human governance despite not being designed for it, rendering them a crippled system-level coordination and dispute resolution mechanism that manages to combine the worst of centralization as unaccountability and decentralization as inefficiency. As an example, "The DAO" episode that has shook the crypto industry demonstrates that it is not unaffected by human politics: “the actual implications of the decision, which essentially showed that a supposedly immutable blockchain history can be altered, is yet to be seen” (del Castillo, 2016). Blockchains were created to bypass human trust which they cannot do. Since Web3 can't stay trustless, it cannot avoid finding ways to acknowledge or encode trusted relationships.

However, since trust minimization is the main social scalability mechanism, Web3 is caught between the requirement for trust on one hand, and the fact that too much trust would undermine the underlying principles of its technology on the other hand. As an example, “simply building on trust and cooperation is not enough. Correcting for biases and tendencies to over-coordinate (or collude) among trust networks is essential to encouraging more intricate, diverse relationships that span greater social distances than before” (Weyl et al., 2022, p. 17). We are left to wonder who has the privilege of defining what prejudice is and correcting it in a supposedly egalitarian and decentralized system? Is the concern about "over-coordination" or "collusion" actually due to the fostering of diversity, or is it driven by the dependence on the blockchain itself? Is the coordination capability of future collaborative networks a systematic threat to public blockchains? Therefore, one way is to solve governance and, “once you address the problem of governance, you no longer need blockchain” (Lehdonvirta, 2016). The other is to keep the blockchain and, as a result, Web3’s “leaderless” society is bound to stay under the control of a "privileged set of entities" (Sultanik et al., 2022).

2.8 Drawbacks summary

The "machine at the center" model of blockchain-based systems, known as Web3, faces several weaknesses that impact its decentralized social scalability. Technically, it struggles to scale without compromising its decentralization principle, faces the threat of collusion, and is prone to exploits and flaws, making it unreliable. Additionally, fees for interacting with the system can be high, and it is dependent on Web2 infrastructure for mainstream adoption. Societally, it commodifies relationships, ignores social and economic issues, and deepens inequalities. It also offers a large attack surface that makes non-technical users vulnerable and blurs the line between genuine human interactions and their instrumentalization into social credit scores. There is also no legal recourse for its users. Financially, it is disconnected from the real economy and reflects the exuberant behaviors of exponential finance. Legally, permissionless systems cannot guard against harmful partners, and there is a lack of legal clarity. Methodologically, Web3 prioritizes technical solutions over societal demands, and ideologically it is based on distrust and values decentralization as an end in itself. Governance is driven by market tactics, leading to a concentration of wealth and power, and it operates without explicit

leadership, making it unaccountable. Overall, what was intended to be decentralized, secure, immutable, censorship-resistant, and fair is becoming its opposite.

As much as one would want to believe in Web3's aspirations, there appears to be a discrepancy between its rhetoric and its actuality. Despite positive experiences, the risks associated with the technology raise questions about its widespread adoption. In terms of brand safety, the combination of speculation, deep fakes, automated processes, and brand retaliation with the immutability and openness of the blockchain, a lack of legislative certainty, and guilt by association presents a challenge for Web3 marketers. Additionally, the missionary-like zeal of venture capitalists promoting Web3's democratic potential while the crypto-libertarian ideal embodies both the market model and the hierarchical model of command and control with its C-suite of "Chief Officers," is concerning.

Web3 faces a new challenge of scaling the technology to meet the demands of enterprises and onboarding the next billion users without trading away its decentralized, trustless, and immutable nature (Tapscott, 2022). The belief that enduring pain today will improve things in the future is suggestive of messianic solutions. The future potential of Web3 is troubling because it has operated unchecked with minimal regulatory oversight. As regulation puts Web3 under the control of centralized authorities, the regulation is perceived as leading towards a zero tolerance for anything that doesn't give full control and surveillance powers to the state (Christensen, cited in Nicolle, 2022). Some companies, however, see Web3 not just as a new technology but also as a new cultural movement (Stott, 2022). The question remains, what will be the next steps for Web3? And why does it always boast about its "next big thing" and its potential to transform the world, but never about its achievements? The journey itself could be the destination, and the pain experienced by its users might not be worth it.

The hype around Web3 and its potential as a decentralized and trustless system has overshadowed the limitations and challenges that it faces. While its goal of eliminating the need for centralized intermediaries has created a fervent following, and even a quasi cyber religion, the reality of its implementation has shown that the combination of technology and human behavior can create new problems. "A minimum amount of governance at the protocol level enables the greatest amount of freedom and flexibility at the app level. However, the protocol may wish to retain some degree of adaptability. This creates a potential market-driven trade-off between immutable credible commitments at the protocol layer and user retention, or growth choices, at the app layer; in other words, trustworthiness versus adaptability" (Smith & Hall, 2022). The tension between the principles of trustworthiness and adaptability highlights the trade-off that Web3 faces between its ideals and the practical considerations of widespread adoption. Despite the initial excitement around Ethereum's upgrade, the reality of centralization concerns calls into question the long-term viability of Web3's decentralized approach. "Ethereum's transition to PoS (Proof of Stake) was celebrated as a key upgrade. However, a month after the move, centralization concerns are mounting high" (Jha, 2022). The interplay between the technical aspects of Web3 and the human governance that inevitably drives it can result in the centralization that Web3 aims to avoid.

Blockchain technology, which started as a solution to secure decentralized payments, has become a catch-all solution for a variety of problems in various industries. Despite its versatile potential, the application of blockchain in some cases can be questionable. “There are no applications of blockchains which do not involve a double-spending problem. A blockchain that was used for an application with no double-spending problem is nothing more than a database, so you could just replace it with a distributed hash table. People have also used the blockchain for timestamping. This only works because Bitcoin has become well-known as a point of reference. If you had a need for timestamps, you certainly wouldn’t invent a blockchain to do it. Yet people are running around everywhere in the Bitcoin world screaming ‘blockchain blockchain blockchain’ for all kinds of non-intuitive purposes until they’re buried under piles of money” (Krawisz, 2016). In other words, blockchain has been wrongly perceived as a solution for every problem. “Between notarial deeds, law, health care, supply chains, the creative industry, and other industrial sectors, “blockchain became a blank canvas onto which any problem could be painted as being solvable” (Song, 2019). The hype surrounding blockchain and decentralized finance has been described as an “illusion” by Bank of International Settlements General Manager Agustin Carstens. He argues that advocates of a decentralized future of money based on blockchain technology are not taking a practical approach. Despite this criticism, the potential of blockchain technology to disrupt cross-border payments remains significant. However, it’s important to carefully evaluate and consider the practical application of blockchains in various industries to determine its necessary and appropriate usage.

While we recognize that the disruptive potential of Web3 is appealing, it is important to consider the various factors that may have led to excessive enthusiasm and a blind following of the technology. The hype, fear of missing out on “the next big thing,” and unspoken desires for financial and political gain have all played a role in the widespread adoption of Web3. Some have even been lured by venture capitalists whose bottom line is profit at any cost, regardless of the consequences. However, the gospel solutions presented by Web3 maximalists, promising to disrupt power dynamics and rearrange the world to our liking, may ultimately be nothing more than a disguise for the same old power dynamics wrapped in the veneer of new technology. Therefore, it is important to take a step back and critically evaluate the motivations behind the adoption of Web3 and its potential outcomes, rather than embracing the “lemming effect.” As Trivedi (2022) states, “we might have been subject to a hive mind and collective frenzy.” And as Song (2019) points out, “we might have been under the influence of people that appear to be on the leading edge of something that’s too technical for others to question effectively.”

Web3’s journey started with the realization that “the central bank must be trusted not to debase the currency, but the history of fiat currencies is full of breaches of that trust” (Nakamoto, 2009). However, the spirit that animates centralized authorities appears to have taken root in the decentralized economy, as Web3’s history of grand rhetoric is replete with breaches of trust. (see White’s Web3 is going great, 2022). In this regard, Web3’s lofty goals are reminiscent of the previous “sharing economy,” whose peer-to-peer model promised to ease collaboration and resource sharing on community platforms. Instead, the model has reverted to a “gig economy,” in which companies treat workers as employees in terms of control but without the financial and social costs associated with hiring them, resulting in the creation of a new class of jobholders

known as the precariat, a compound of precarity and proletariat. Similarly, while NFTs have the potential to “usher a creative and artistic renaissance” (Hahn, 2021), the reality is that “people are coming up with fresh ideas for how citizens of the Third World can be put to productive use by wealthy Westerners. [...] It's an odious idea, perfectly in-character for the NFT field, and literally the dictionary definition of exploitation” (Irwin, 2022).

Despite the significant interest and investment in blockchain technology at the time of writing, there are questions and concerns about its potential to be the sole solution for a better future. The hype and excessive enthusiasm surrounding the technology may have overshadowed its limitations, and the idea that profits always come at the cost of losses elsewhere (Saito, 2022). There is also the potential for the technology to be used as a disguise for the same power dynamics and extraction mentality, despite promises to level the playing field for all participants (Trivedi, 2022; Song, 2019). As the Web3 movement shifts towards a Decentralized Society (DeSoc) model that relies on peer-to-peer social attestations, the next big challenge will likely be the development of distributed trust relationships that go beyond blockchain-driven dynamics. Although DeSoc offers ways to bridge the on-chain and off-chain worlds, it currently lacks off-chain social scalability mechanisms that incentivize cooperation among users. According to Weyl et al. (2022, p.29), there is more than one road to DeSoc, and non-blockchain-based frameworks that rely on local data stores and trusted introductions may eventually offer greater trust across social distance. The authors suggest bootstrapping off “thick” community channels, where Social Bond Tokens (SBTs) signal authentic off-chain community membership with strong social bonds and repeat interactions (Weyl et al., 2022, p.23).

The “machine-at-the-center” model, defined by its lack of accountability and headlessness, is inherently unpredictable and fails to provide adequate protection for its users from one another. We firmly believe that relying solely on this approach as the cornerstone of a complex and interconnected society is not sustainable and is unlikely to foster growth and prosperity.

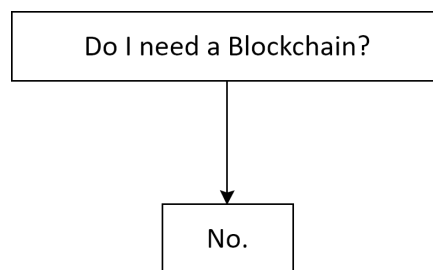


Fig. 1. Vinton Cerf, “Father of the Internet.” *Simple flowchart*. Twitter, 2018.

3. Potential of the human-centric approach

We recognize the crucial role that technology plays in addressing the challenges of the future. However, our ultimate objective is to navigate uncertainty in a way that prioritizes both people and the environment. This requires placing humans at the core of the system. To initiate the conversation, we propose some initial ideas that align with this line of thinking.

3.1 Updating the social operating system

According to the principles of Spiral Dynamics, the evolution of social systems is driven by the interaction of "life conditions" and the mind's capacities, which lead to the emergence of new values and worldviews in response to the challenges of previous systems. When there is a loss of trust in leadership, it is a sign of a significant societal upheaval or at least an impending transformational moment. According to Kavanagh et al. (2020), trust barometers have recorded such trust deficits, indicating that these institutions are facing a long-term confidence crisis. Web3 chose to address this issue by avoiding trust altogether, instead opting for a strategy that disregards people and their interactions. This approach is incongruent with our values, and so we aim to become "trustful" rather than "trustless" as we work to rebuild trust in social structures. By focusing on soft power, or the ability to attract and appeal rather than coerce, we aim to create a new set of social dynamics that emphasize relationships and individual interactions, fostering collaboration and resonant leadership. This approach would complement the traditional power dynamics of hierarchical institutions and markets, represented by the "rule of law" and the "law of the jungle," respectively (Borrell, 2022).¹⁴

The liberal democracies of today are facing a challenge as the relationship between the state and the market becomes increasingly blurred. The socialization of losses and the privatization of profits, as well as the entrenchment of market principles in laws, have left the "sovereign individual" feeling like their vote no longer makes a difference. The rise of soft power, as seen in online communities and the growth of the "third sector" and citizens' assemblies (Fournier et al., 2011), has forced hierarchical institutions to experiment with new forms of organization. "Some countries have created opportunities for younger generations to have a voice in decisions that affect them, through youth councils, parliaments and ministries. However, these solutions have not always avoided tokenism, often remaining peripheral to core political processes. Youth-led protest movements are frequently driven by deep distrust of today's political classes and desire for proper engagement in decision-making. Yet some authorities have clamped down on peaceful protest, dismissed young people as too inexperienced and treated them as beneficiaries or, worse, as threats rather than equal partners" (United Nations, 2021).¹⁵

This is not the first time that humanity has faced the need to update its "social operating system" by including those left out by the powers in place. Web3 is, in fact, an example of such an attempt. As a renaissance of market expression in the digital age, it attempts to incorporate community coordination through its DAOs. This is significant because it brings together the

¹⁴ The phrase "law of the jungle" is a misnomer as it fails to accurately reflect the complex and cooperative nature of these ecosystems.

¹⁵ United Nations. (2021). *Our Common Agenda*. Report of the Secretary-General. p. 39.

conflicting dynamics of the market and community, which are nevertheless both network-friendly forms of social organization. However, what started from the realization that centralized institutions have been entrusted not to debase the currency, but that "history is full of breaches of that trust" (Nakamoto, 2009), can be transposed to the Web3 ecosystem itself, where founders have been entrusted not to "pull the rug"¹⁶ or to "exit scam," but it can be argued that the history of crypto projects is also full of breaches of that trust (White, 2022). Therefore, a change in technology will not get us anywhere if the same spirit that drives the behavior of these centralized powers also drives those who favor decentralization. It is noteworthy that, just as spiral dynamics pertains to the mind's abilities, it also applies to the scalability of society, which is "the ability of an institution [...] to overcome shortcomings in human minds that limit who or how many can successfully participate. [...] It's about human limitations, not technological limitations or physical resource constraints" (Szabo, 2017).

The drawbacks of relying solely on technology to achieve decentralization, along with the lack of actionable academic insights on how to revitalize social systems, have led to a pressing inquiry into what steps can be taken by civil society to address these issues. With the limitations of the partisan political system becoming evident, will society have the necessary infrastructure in place when the time comes to diffuse social energy and address street protests and the rise of "politics by extraordinary means"? A human-centric approach to social scalability would thus need to overcome shortcomings in human minds. Therefore, it would have to emerge from the initiative of individuals who have altered their perspective on their responsibilities, which is not the province of technological progress. Technology and business models serve as an amplifier for collective action, but they will not fundamentally alter society on their own.

In a post-abundant world, the traditional debate between rights and responsibilities gains a new dimension as interdependence becomes inevitable. According to Schmachtenberger (2017), our win-lose game theory, coupled with exponential technology, is now existential, and we must transition to a post-rivalrous world. However, effecting this change requires individuals to take responsibility and lead by example, even though few are likely to do so, and a radical transformational shift in society is unlikely. Civil society-driven projects remain constrained by legacy infrastructure and Web2 terms of service and may conflict with national interests or regulatory authorities (The White House, 2022). Therefore, the solution is not to replace Big Tech and Big Gov from the outside, but to create change from within.¹⁷

To holistically address the wellbeing of individuals and communities, we need a pragmatic approach that navigates the complexities of the current century. Currently, institutions, markets, and Web3 view social and emotional development as secondary considerations. However, we believe that different social models can complement each other and help societies progress. To do so, flexible coordination mechanisms involving top-down and bottom-up approaches and

¹⁶ Rug Pull, "a malicious maneuver in the cryptocurrency industry where crypto developers abandon a project and run away with investors' funds". In *CoinMarketCap*. Retrieved November 2, 2022, from <https://coinmarketcap.com/alexandria/glossary/rug-pull>

¹⁷ "Yesterday I was clever, so I wanted to change the world. Today I am wise, so I am changing myself." Quote from Rumi, 13th century Persian poet.

peer-to-peer dynamics are crucial. Hierarchical institutions and markets will continue to play essential roles in society, but they must adapt to the information age and to the new demands of the world by modifying their structures and processes.¹⁸ Collaborative networks may become more prominent over time, leveraging interpersonal connections across different industries and disciplines. All types of organizations will coexist and synergize, focusing on their unique strengths: resolving disputes for institutions, facilitating trade for markets, and promoting mutual support for collaborative networks.

In a rapidly changing and complex world, it is crucial to have social frameworks that can effectively respond to dynamic conditions. The ability to seamlessly integrate diverse forms of governance, such as kinship-based tribes, hierarchical institutions, competitive markets, and collaborative networks, is a crucial factor in societal evolution, as noted by Ronfeldt (1996). Without proper balance, hierarchical institutions, such as states, armies, or churches, can become feudalistic, while unchecked market forces can also result in a feudalism of economic means. The emergence of collaborative networks as a new social force promoting cooperation could provide a necessary counterweight and strengthen overall societal resilience. As society has evolved from kinship-based models to hierarchical institutions to self-organized markets, it may now be time for the rise of self-organized collaborative networks and their pursuit of purpose. This shift would likely require a reimagining of the social contract between states, markets, and citizens, prioritizing complexity, cooperation, and scalability. It does necessitate an ecosystemic approach that transcends binary oppositions. Ultimately, a society that can balance and integrate diverse forms of governance has a greater potential for long-term resilience and prosperity.

With the increasing ubiquity of information technology, the network form of social organization is poised for growth and maturity. However, to fully realize its potential, it is essential to recognize the limitations of the current social media paradigm and embrace a new approach that prioritizes substance, community, and authenticity. Current social media platforms have a business model that prioritizes meaningless engagement, leading to issues such as narcissism, hate, and division at the individual level and mob behavior and the weaponization of public opinion at the societal level (Gorodnichenko et al., 2018). In today's digital age, they have become a dominant force in shaping our online experiences. Despite the proliferation of new and exciting services offered by Web2 companies, corporate entities are often criticized for their asymmetry of power as they can exploit digital footprints and data trails and sell end-user data, deplatform, life ban and shadow ban users, demonetize creators, filter, de-index, and blanket flag content at their discretion with the near-absolute control of their manipulative algorithmic

¹⁸ As an example, and as Schleifer et al. (2022) observe, the advent of life-long learning and on-demand education platforms and their Massive Open Online Courses (MOOCs) offer an alternative to the outdated Napoleonic hierarchical school system. It is worth noting that the terms "schooling" and "education" have different connotations: while schooling refers to instructing, reprimanding, disciplining, and reproofing, education, deriving from the Latin verb "educare" meaning "to develop the inner talent of a child or person," focuses on individual development. The legacy school system, which prioritizes "programs" and "instruction," reflects a historical perspective of individuals as cogs in the machine, conditioned to fit within the hierarchy of society as taxpayers or civilians. This perspective is not unlike contemporary algorithmic models, which often reduce individuals to mere variables or end-users within the social operating system.

systems. Jack Dorsey, co-founder of Twitter, recognizes the need for a new platform model, stating "A new platform is needed. It can't be a company" (Jackson, 2022). While the format and technology of the social web have evolved over time, its underlying worldview has remained tied to the dominant social force of the time. The Internet was created by the hierarchical institutional framework (military) and the first web was created by academia, both of which are now being challenged by the market and the community, both of which are the expression of the network form of social organization which undermines hierarchies.^{19 20}

While we share Web3's intentions of more decentralization, of community-owned networks, and of greater transparency, we wish to express them in a way that resonates with the cooperative ethos to ensure that they prioritize social justice and solidarity over libertarian principles and disruptive rhetoric. As stated by Weyl et al. (2022), "At best, DeFi risks throttling network growth by rent extraction and, at worst, risks ushering in dystopian surveillance monopolies dominated by 'whales' who harvest and Hoover up data in a race-to-the-bottom, much like Web2" (p. 17). In collaborative networks, social interactions are deeply rooted in the fabric of a tight-knit community of participants who mutually support and oversee one another. "Norms and trusty behaviors would be enforced by group pressure, and prisoners' dilemmas would be obviated by the strength of personal relations; this strength being a property not of the transactors but of their concrete relations." (Granovetter, 1985). The question of how to create incentives within these networks is critical, with competition and cooperation being two common strategies. "Creating competition and fostering cooperation are two alternative ways of creating incentives. [...] The question we tackle here is: when should incentives be provided collectively, on a team basis, or relatively, thereby creating competition among the agents? Most of the mechanisms identified in the agency literature either favor pure competitive or collective schemes. But real-life examples abound in which the provision of incentives is mixed" (Fleckinger & Roux, 2012). Furthermore, empirical research shows that "coopetition" models enhance both the quantity and the quality of a crowd's creative performance (Elmoukhli et al., 2016).

We aim to investigate collective intelligence techniques, the "wisdom of the crowd,"²¹ as well as the potential of real-time collective decision-making of swarm intelligence.²² By focusing less on the technology and more on the governance processes that promote human bonding at the heart of collective problem solving, our ambition is to foster social innovation so that society may transition from a zero-sum game to a win-win system. "To ensure that the new system doesn't eventually self-terminate, it has to have the same type of complexity-increasing antifragility of the natural world. It has to be an extension of the symbiosis and novelty maximizing, complex system dynamics of nature. [...] This requires a fundamentally anti-rivalrous macro-context

¹⁹ Arpanet. In *Wikipedia*. Retrieved October 27, 2022, from <https://en.wikipedia.org/wiki/ARPANET>

²⁰ The Birth of the Web. In *CERN*. Retrieved October 27, 2022, from <https://home.web.cern.ch/science/computing/birth-web>

²¹ Wisdom of the Crowd. In *Wikipedia*. Retrieved October 2, 2022, from https://en.wikipedia.org/wiki/Wisdom_of_the_crowd

²² Swarm intelligence is a collection of techniques that combine human input with AI algorithms capable of solving complex problems. Crypto Swarm. In *Crypto Swarm AI*. Retrieved October 2, 2022, from <https://www.cryptoswarm.ai/>

[where] extraction is replaced with contextualization; (value) abstraction with instantiation; and accumulation with distribution and flow dynamics" (Schmachtenberger, 2017).

To reduce the risk of social instability, we must first recognize the pervasive influence of social structures that are rooted in Hobbesian assumptions (Turner, 1998), and benefit from binary antagonisms, emotional divisions, and identitarian attachments. Lenartowicz (2017) notes that individuals are often viewed as mere resources to be exploited by social systems for their own perpetuation. For example, the "divide et impera" mindset fueled by political partisanship²³ and cultural wars²⁴ perpetuate in-group and out-group dynamics, while algorithmic systems have little incentive to curb hate speech if it drives user engagement and corporate profits. Heylighen et al. (2018) highlight the insidious use of emotions to control human behavior, such that individuals police their own behavior even in the absence of external reinforcement or punishment. This is because social norms are internalized to such an extent that external enforcement is no longer necessary.

We are now entering a "post-truth" era characterized by protesters and counterprotesters who are becoming "cynical about the values of democracy" (Guilford, 2016) and have little tolerance for opposing viewpoints, even if it means capitulating to authoritarianism and giving up all the social progress gained over decades. The incentives and social scalability mechanisms offered by bureaucratic institutions, competitive markets, Web2 algorithms, and Web3 tokens are all built on impersonal ties. Institutions, markets, and technology all contribute to the erosion of social ties as they do not seem to help create the personal bonds that would help stabilize trust at the macro-societal level, and they do not seem very conducive to citizens and end-users developing mutual trust and understanding with one another. The purpose of a society, as in human organization, can be interpreted in different ways depending on one's perspective and values. Some might argue that the purpose of a society is to provide security and protection to its members, while others might see it as a means of achieving common goals and promoting the general welfare. The purpose of a society can also be viewed in terms of providing a framework for human cooperation, allowing people to live together in relative harmony and to share resources and knowledge.²⁵ Technological changes and their societal consequences suggest the emergence of a global metasystem beyond markets and nation-states, requiring a new level of political organization to guide the process of self-organization. This includes the creation of networks with automated and collaborative components, based on distributed and open-ended intelligence, as well as the socio-economic theory of the Commons for distributed modes of organization based on democratic management and open access (Last, 2017).

²³ "The alternate domination of one faction over another, sharpened by the spirit of revenge natural to party dissension, which in different ages and countries has perpetrated the most horrid enormities, is itself a frightful despotism" (Washington, [1796], 2000, pp. 16-17).

²⁴ The era of romantic revolutionaries seems long gone in which "the people" was simply the source of legitimacy for the exercise of sovereign power in the modern nation-state. Its sanction was gained not by the prosaic counting of parliamentary or class division, but by the poetic invocation of a forgotten inner unity" (Billington, 2007).

²⁵ Society. Mid 16th century in the sense 'companionship, friendly association with others': from French *Société*, from Latin *Societatem*, derived from socius 'companion'. (Companion. Middle English: from Old French *compagnon*, literally 'one who breaks bread with another', based on Latin *com* 'together with' and *panis* 'bread').

Attributes	Hierarchical institutions	Competitive markets	Collaborative networks
Decision-making	Centralized	Decentralized	Ad hoc
Hierarchies	Static	Implicit	Dynamic
Leadership	Dissonant	Opaque	Resonant
Key characteristics	Stable and rigid	Adaptive and extractive	Adaptive and cooperative
Key value	Order	Profit	Purpose
Social scalability	Law, command and control	Money, price, regulation	Interdependence of outcomes
Reward for obedience to norms	Official status	Financial capital	Social capital
Basis for social contract	Dependence	Independence	Interdependence
Horizontal relationships	Impersonal	Impersonal	Interpersonal
Social trust	Minimization	Minimization	Maximization
Humans in the system	At the center	At the edge	At the center
Integration of subjective dimensions	Low	Sidestepped	High

Table 1. Comparison of Key Attributes of Hierarchical Institutions, Competitive Markets, and Collaborative Networks.

3.2 Entering uncharted territory

The human-centered approach to decentralized social scalability through collaborative networks is unique in that it enables users to meaningfully participate and contribute to collective actions. For instance, short-seller activism has gained traction in recent times as professional investors use social media to incite crowds to rally behind their negative bets on a particular stock. The emergence of "meme traders" is an outcome of apps and websites that have made investing in the stock market easy, with impromptu investors joining hands to reset the power balance between Wall Street and Main Street. The subreddit r/WallStreetBets has demonstrated the potential for social convergence through the spontaneous gathering and coordination of amateur traders, without relying on cumbersome blockchain technology or decentralized autonomous organizations. The enthusiastic participation of these traders has had a profound impact on hedge funds (Benstead, 2021). What makes this exceptional is that it was unforeseen by everyone. According to a Main Street perspective of the GameStop incident, it "felt like coming together, and there was a sense of community. Everyone now has a common goal, and

it's not to get rich, it's to bring down those hedge fund bastards." On the other hand, Wall Street had a different view, "before GameStop, there was a sense that you don't challenge the hedge funds because they're the big players." However, the GameStop story was so unusual because "that's exactly what happened," as a group of retail investors on Reddit, some with limited experience drove up the stock price to an extreme level [by buying GameStop shares] without considering the underlying fundamentals of the company's actual value (Stokel-Walker, 2021).

The coordinated actions of aligned individuals across various industries can have more leverage than atomized individuals who can only temporarily lower a corporation's stock by tweeting their displeasure. The potential for such individuals to quickly tackle issues from different angles and contexts can positively impact or disrupt the viability of any social system, both from outside and within, simultaneously, due to the "small world" effect. This effect arises because a network's architecture fundamentally influences the interplay between local and global dynamics, with small-scale actions having far-reaching consequences (Watts & Strogatz, 1998). As highlighted by McCormick (cited in Stokel-Walker, 2021), "if you unleash millions of people who have never done this before and they can also congregate on Twitter or Reddit or wherever else, things are just going to accelerate a lot more quickly than you would expect." With Pandora's box now open, and the capability to replicate the process easily accessible to anyone, including impulsive individuals who have a "you only live once" (YOLO) mentality and disregard logic and consequences, there is a crucial social obligation to prevent unfavorable outcomes.

As change is the only constant in a world that is facing impending challenges, an ideological battle over societal structure has begun. The question is whether to organize as a hierarchy of subordinate individuals, an arena of competing agents, or a network of cooperative humans. Rather than perpetuate these conflicting worldviews,. This approach would include different perspectives and maximize checks and balances to the greatest extent possible. To ensure a multistakeholder approach, we propose deploying a collaborative infrastructure as a community-owned network that involves all stakeholders in its governance. This approach would leverage economies of scale and collaborative action to the fullest extent possible, without preempting a multistakeholder conversation.

3.3 Chaordic cybernetics²⁶

Our goal is to chart new territory by developing a set of guiding principles that draw on the attributes of chaordic organizations and the insights of the science of cybernetics. Chaordic is a term coined by Dee Hock, the founder and former CEO of Visa International, to describe a new kind of organizational structure that combines the best aspects of chaos and order. The concept is based on the idea that in order to be adaptive and flexible in a rapidly changing world, organizations need to embrace both the randomness and unpredictability of chaos and the stability and order of traditional hierarchical structures. Chaordic organizations are designed to be self-organizing, with decision-making power distributed throughout the organization and processes that are able to adapt and change in response to new conditions. The goal of

²⁶ Cybernetics, a term coined by Norbert Wiener in the 1940s, is the study of communication and control in systems, both natural and artificial. Cybernetics seeks to understand the feedback mechanisms that govern the behavior of complex systems and how they can be controlled.

chaordic organizations is to be more resilient, innovative, and effective than traditional hierarchical structures.²⁷ The chaordic process starts with a clear purpose that unites and guides the community, supported by principles and identification of participants in governance, ownership, rewards, rights, and obligations. Relationships are visualized to best enable pursuit of the shared purpose and documented to create a legal framework. Finally, the community functions within this structure to pursue the shared purpose and create a flexible framework for ongoing growth and evolution.

Cybernetics offers important insights into human organizations, including the significance of feedback loops, system thinking, control and regulation, and information processing. By applying these principles, organizations can enhance their communication, decision-making, and performance. William Ross Ashby, a founding father of cybernetics, developed the "Law of Requisite Variety," which states that in order for a system to effectively regulate itself in the face of unpredictable inputs and disturbances, it must have at least as much variety in its responses as the variety in the inputs. One of the contemporary focuses of cybernetics is on creating human-made systems that meet ethical standards to avoid a *cyber misanthropic dystopia*. "The ethical regulator theorem claims that the following nine requisites are necessary and sufficient for a cybernetic regulator to be effective and ethical: (1) Purpose expressed as unambiguously prioritized goals; (2) Truth about the past and present; (3) Variety of possible actions; (4) Predictability of the future effects of actions; (5) Intelligence to choose the best actions; (6) Influence on the system being regulated; (7) Ethics expressed as unambiguously prioritized rules; (8) Integrity of all subsystems; (9) Transparency of ethical behavior" (Ashby, 2020).

By exploring these concepts, we aim to create a framework for innovation and collaboration that combines the flexibility and adaptability of chaordic organizations with the systemic and self-regulatory principles of cybernetics. This approach can help us to navigate complex and dynamic systems, while promoting ongoing learning, feedback, and self-correction.

4. The rise of collaborative networks

The complexity and unpredictability of today's interconnected and dynamic world requires a systemic transformation of traditional and rigid organizations into agile and innovative ones. Collaborative networks hold great potential as the future of social organization for a number of reasons. Firstly, they would allow for decentralized decision-making and the distribution of power, which leads to a more resilient, equitable, and just society. Secondly, they would be highly adaptable and flexible, which is crucial in a rapidly changing world. Thirdly, they would foster collaboration and teamwork, enabling people to come together and achieve common goals. Finally, they would harness the power of technology to connect people, resources, and ideas in ways that were previously not possible, leading to increased efficiency, innovation, and impact. The rise of collaborative networks represents a new way of organizing society, one that

²⁷ Their principles are designed to: foster shared purpose and values, empower self-organization, distribute power equitably, balance cooperation and competition, promote learning and innovation, respect human spirit and the environment, encourage creativity and diversity, manage conflict constructively, and integrate command and control methods.

prioritizes collaboration, equity, and adaptability, and leverages technology to create positive change. With networks that provide a level of agility that cannot be matched by conventional regulation, decentralized governance is poised to emerge as the new norm.

This involves establishing collaborative networks that are free from speculative influences, and creating new social structures where collective actions are driven by social resonance rather than top-down control. At the heart of this transformation lies an ecosystemic perspective and self-organization, which foster a sense of ownership, responsibility, and self-determination. Ecosystems provide a promising alternative in the face of unpredictable risks, but they render traditional hierarchical mindsets and management approaches outdated. This cultural shift marks a departure from older social systems, which feature established power structures and resistance to change, and were designed with the aim of exerting control over others. Social structures play a crucial role in defining our interactions and, in a society that needs to be more self-organizing and cooperative, they raise essential considerations about the kind of relationships we want to build. The goal is to distribute governance, responsibility, accountability, risk, checks, balances fairly throughout the system while maintaining high levels of trust and flexibility, thus without the need to distribute the infrastructure (Marlinspike, 2022).

4.1 Distributing trust

Web3 marks a significant achievement in the pursuit of a decentralized solution to intermediary trust issues. Despite its roots in trust minimization, the concept of trust is rarely, if ever, clearly defined. We know that, as a “technology of trust,” the intention is to shift some of the trust in people and institutions to trust in technology and combine “the openness of the internet with the security of cryptography to give everyone a faster, safer way to verify key information and establish trust” (Goldman Sachs, 2017). We know that blockchains establish trust through resolving the Byzantine generals' problem, which highlights the challenges that scattered parties have in achieving consensus.²⁸ We know that each consecutive block adds to the information contained in prior blocks, forming an immutable data timeline that can be securely trusted (ICAEW Insights, 2022). The fact that records are public and cannot be deleted, modified, or copied enhances trust, which is further bolstered by duplicating and verifying the information across several computers in a network (Yaga et al., 2018) Therefore, “Trust does not rest with the organization, but rather with the security and auditability of the underlying code” (Wright and De Filippi, 2016, p. 16). However, the issue at hand is more related to verification rather than trust, as noted by Schneier (2019).

So, in distributed systems, there is the need to trust the system, or to have confidence in its integrity, and there remains an irreducible need to trust other participants, or to entertain a belief in their benevolence. Here, we investigate how to achieve decentralized social coordination without supervision through a mesh of trusted relationships. We define trust as a “relational attribute (interpersonal trust) where trusting actors willingly put themselves in a position of vulnerability in order to achieve a positive outcome.”²⁹ Following Rousseau et al. (1998), “trust

²⁸ Byzantine Fault. In *Wikipedia*. Retrieved May 4, 2022 from https://en.wikipedia.org/wiki/Byzantine_fault

²⁹ We derive our definition of trust from Becker, M. & Bodó, B. (2021). Trust in blockchain-based systems. *Internet Policy Review*, 10 (2). <https://doi.org/10.14763/2021.2.1555>.

is a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another.” Trust is thus a conscious choice that is not imposed nor suffered but perceived as an opportunity to realize unmet potential. Thus, trust with other participants is not only understood negatively as a risk but also positively as an opportunity. Our approach to trust shifts from being “risk-averse” to being “risk-aware.”

Trust is a multifaceted social phenomenon that resists easy codification due to its complexity and relational context. As Stahl et al. (2018) argue, trust cannot be connected to objective realities or mathematical algorithms alone, but rather is highly connected to the concept of intersubjectivity. Intersubjectivity has been defined as "mutual awareness of agreement or disagreement and even the realization of such understanding or misunderstanding" (Gillespie and Cornish, 2010, p.19). Trust is thus a fragile experience that requires vulnerability and goodwill. Trust involves unspoken expectations, informal responsibilities, limited cognitive resources, and emotional attunement. It is a two-way relationship that must be earned and given, and is the cornerstone of cooperation and preferential attachment because it is a relational investment that takes effort to build and that is relatively simple to erode. Over time, trust reduces uncertainty about others' behavior and can serve as the bedrock of social capital, which we define as networks of relationships and the ability to mobilize them. “Social capital involves the potential of individuals to secure benefits and invent solutions to problems through membership in social networks.”³⁰ We aim to explore how social capital can reduce the burden of trusting others, catalyze decentralized social coordination, and complement other social scalability strategies in the absence of centralized control, code, or game theory.

In contrast to Web3’s take on trust, we thus presume that the dimensions of trust are too elusive to be codified or tokenized meaningfully. We further contend that they are a vital component of social relationships and communities that should not be commodified anyway. As offline and online social experiences converge to eventually blend with one another, we believe a unique set of dynamics will emerge from changing the premise that a social system must be built on impersonal relationships.³¹ Through information technology, we now have a unique opportunity to leverage meaningful connections beyond our usual trusted landscape and actualize existing networks of trust into a mesh of personal relationships that can span the entire social fabric. We thus want to reframe the purpose of decentralized social coordination in the context of personal relationships in order to reduce uncertainty while also unlocking the positive potential of trusting others. This does not mean trusting everyone, but that the people we trust do trust others we do not know yet, and that offers potential leverage. “The embeddedness argument stresses instead the role of concrete personal relations and structures (or “networks”) of such relations in generating trust and discouraging malfeasance.” Furthermore, “the widespread preference for transacting with individuals of known reputation implies that few are actually content to rely on either generalized morality or institutional arrangements to guard against trouble. Better than the

³⁰ Social capital. (August 2, 2022). In *Encyclopedia Britannica*, <https://www.britannica.com/topic/social-capital>

³¹ “The field of social dynamics combines ideas from economics, sociology, social psychology, and other disciplines, and is a subfield of complexity science. The fundamental assumption of the field is that individuals are influenced by one another’s behavior” (Social dynamics, op. cit.).

statement that someone is known to be reliable is information from a trusted informant that he has dealt with that individual and found him so. [...] Individuals with whom one has a continuing relation have an economic motivation to be trustworthy, so as not to discourage future transactions; and departing from pure economic motives, continuing economic relations often become overlaid with social content that carries strong expectations of trust and abstention from opportunism” (Granovetter, 1985). By maintaining social context, people can maintain trust and cooperation because the prisoner’s dilemma is removed by the dynamics of social capital.

4.2 Circular causality between self-organization and emergence

Complexity theory provides a framework for understanding the behavior of complex adaptive systems, including social systems, in the absence of central control or oversight. “Complex adaptive systems consist of a large number of interacting agents. Agents are goal-directed, cognitive individuals capable of perception, information processing, and action. However, agents are intrinsically “bounded” in their rational understanding of the system they belong to, and its global organization tends to emerge from local interactions, resulting in a coordination of the agents and their actions. This coordination minimizes conflict or friction while facilitating cooperation or synergy. The basic mechanism is the reinforcement of synergetic interactions and the suppression of conflictual ones. As a result, the system as a whole starts to behave like an integrated cognitive superagent” (Heylighen, 2013). This theoretical framework, with roots in physics and biochemistry, has often been proposed as having relevance to change in social systems as it can provide insights into how social self-organization can emerge from the collective behavior of individuals and groups.³² This is of interest to us for two reasons: first, because a more decentralized society could benefit from these insights; and second, because we have examples of self-organization in human groups.

However, recent research suggests that although complex adaptive systems theory has provided valuable insights into understanding the dynamics of social groups and organizations, it still lacks the necessary tools to create emerging coherent structures within human social systems (Pescetelli et al., 2020). Dissipative self-organization processes are often used to describe the behavior of crowds in highly turbulent or chaotic situations, such as a panicked crowd in a stadium or a rioting mob (Smith and Comer, 1994). In these situations, individuals in the crowd interact with each other in complex and often unpredictable ways, responding to both internal and external stimuli. The behavior of the crowd as a whole can exhibit emergent patterns, such as waves of movement, clustering, or polarization. These patterns can arise spontaneously from the interactions between individuals, without any centralized control or direction. Although the science of complex adaptive systems is often associated with chaotic or unpredictable environments, it can offer valuable insights into how self-organizing behaviors can lead to stable and effective social structures. In particular, understanding how self-organization can contribute to the emergence of trust within social systems could help address issues of cohesiveness and organizational effectiveness, which are critical for the success of distributed social systems (Last et al., 2018).

³² We understand ‘social systems’ as “the patterned network of relationships constituting a coherent whole that exists between individuals, groups, and institutions.” In Merriam-Webster.

One approach to building a social theory based on self-organization is to focus on the conditions that promote or inhibit self-organizing behavior. In a stable and predictable environment, there may be fewer opportunities for self-organization to occur spontaneously, but it may still be possible to facilitate self-organization through deliberate interventions. For example, there are a variety of practices, mechanisms, and events that can foster self-organization in individuals and groups such as: open spaces for participants to create their own solutions and self-organize around the topics that interest them; hackathons for developers, designers, and other creative individuals to work on a specific project or problem over a short period of time by self-organizing around a problem; agile methodologies as a project management methodology that emphasizes adaptability; open-source communities for volunteers to contribute their skills and expertise and self-organize around projects to resolve issues; participatory budgeting for citizen-driven funding; unconferences for participant-driven events; or even games for players to develop self-organizational skills that emphasize collaboration, communication, and responsibility. Another key insight from the science of complex adaptive systems is the importance of feedback loops in driving self-organization. Feedback loops are a fundamental mechanism through which complex systems adapt and evolve over time, and we assume they could be better harnessed to create self-organizing systems in social environments. For example, by providing feedback to individuals and groups about their actions and outcomes, it may be possible to create a self-organizing system that continually adapts and evolves in response to changing conditions. “One characteristic typical of complex adaptive systems is circular causality, or the macro-micro feedback loop (Solé and Goodwin), which refers to the fact that the large-scale order of the system is created by the interaction of its parts, but that the interaction of the parts is governed in turn by the large-scale order” (MacLennan, 2007, p.4).

Micro-macro feedback loops refer to the interplay between individual actions at the micro level of the human experience and patterns at the macro level of the social structure. Micro-level feedback loops refer to the local interactions among the components of a system. We will refer to these as horizontal trust. Macro-level feedback loops refer to the global patterns that emerge from those interactions. We will refer to these as vertical trust. In a complex adaptive system, the interactions among the components can give rise to feedback loops at both the micro and macro levels and can create self-organizing patterns and structures that exhibit emergent properties that are not predictable from the behavior of the individual components alone. For example, in a digital platform, at the micro level, users interact with one another by posting content, commenting, and sharing. These interactions give rise to micro-level feedback loops that influence the behavior of individual users. At the macro level, the patterns of interactions among users create global structures and dynamics, such as the emergence of viral memes or the formation of online communities. These macro-level feedback loops can influence the behavior of individual users in turn, creating a complex and adaptive system that exhibits emergent properties. When these feedback loops are present and functioning effectively, they can help stabilize and maintain the coherence and integrity of a self-organized and nested social system by promoting adaptation, resilience, and integration. However, if these feedback loops are disrupted, for example, in a crisis of trust in the governance of the digital platform, this can lead to destructive interference and undermine the stability of the entire system.

Emergence refers to the property of a complex system in which the behavior of the system as a whole cannot be fully predicted or explained by looking solely at its individual parts but from the interactions among its components. Emergence is not a universal property of all complex systems but is context-dependent (Holland, 1998). The nature of the components, the rules governing their interactions, the environment in which they operate, and the goal-directedness of the system, are all factors that contribute to emergence. As such, we advocate for a community-centric model that prioritizes co-ownership, cooperation over competition, emotional resonance over social atomization, a shared sense of purpose over individual agendas, transparent rules by a federated governance, and a digital architecture that allows to maintain a continuum of trust between users. In many cases, emergence and self-organization are mutually reinforcing. The emergence of new cultural values in a social system can lead to self-organization as the system adapts to the new norms. Conversely, self-organization can facilitate the emergence of new properties as the system becomes more interconnected and coordinated. We believe the concept of circular causality can offer an avenue for exploring emergent structures within a self-organized social system that operates in relatively stable and predictable environments, giving rise to dynamic hierarchies which are a pervasive feature of the organization of natural and artificial systems (Corominas-Murtra et al., 2013). To apply a complex adaptive system type of organization to human society, we hypothesize that it would form heterarchical structures that distribute authority across the system according to circumstances. Cumming (2016) suggests that the heterarchy concept unifies hierarchy theory and network analysis by bringing together top-down, bottom-up, and peer-to-peer dynamics. While the heterarchy concept is not new, its full potential has not yet been realized.

In addition to complexity theory, there is also evidence of self-organizing patterns in human groups, both past and present. As Tocqueville ([1831] 2003) observed, the village or township is a natural association that seems to form wherever a group of people are gathered. More recently, Clippinger (2007) noted that businesses with fewer than 150-200 people can rely on informal networks and personal ties to facilitate the exchange of information. Self-organization appears to be viable for social groups whose size remains below Dunbar's limit and that preserve personal interactions, such as communities. We define communities as groups of people with shared ownership, responsibilities, and interests that thrive on reciprocal behavior. Reciprocity involves a sense of equivalence that avoids settling accounts, and it helps to reinforce trust that binds communities together. People engage in uncalculating cooperation to signal that they can be relied upon to cooperate in the future (Jordan et al., 2016), which is in line with the evolutionary approach of "whatever is successful, is likely to appear more often in the future" (Axelrod & Hamilton, 1984, p. 169). Therefore, we suggest paying more attention to the emotional psychic drives of subjectivity as experienced in human-sized communities where trust, emotional resonance, reciprocal behaviors, and self-organization feel natural, to inform a more stable and viable architecture at the macro level of the social system.

4.3 Human challenges of decentralized social scalability

Social scalability refers to the ability of a social organization to effectively and efficiently manage growth and expansion. It encompasses both the capacity of an organization to accommodate increased complexity and size, maintain or improve its overall performance as it grows, as well

as its ability to protect its members from each other and the organization itself. Social scalability operates differently across various forms of social organizations, such as institutions, markets, and collaborative networks. Institutions are often characterized by a hierarchical structure, with clearly defined roles and responsibilities. They are typically best suited for handling large-scale operations because they have established structures, rules, and procedures that provide stability, predictability, and control, but may struggle with adapting to change and innovation. Markets, on the other hand, are based on a decentralized system of exchange, where individual agents interact to allocate resources and make decisions. Despite being highly adaptable and responsive to change, markets may not always lead to the best outcomes for the larger system, as they lack coordination and externalities are not accounted for. Collaborative networks, such as peer-to-peer networks, are based on decentralized and self-organizing systems. They are highly adaptable and can handle complex and large-scale operations, but may struggle with maintaining reliability and consistency because they are based on voluntary participation and informal relationships. In order for social organizations to achieve social scalability, they must balance the benefits of decentralization and adaptability with the need for coordination and consistency. This often involves finding the right balance between centralization and decentralization, and between formal rules and informal norms. Ultimately, the success of social scalability depends on the ability of an organization to effectively manage growth, maintain performance, and adapt to changing circumstances and challenges.

Decentralization, the process of distributing power and decision-making away from a centralized authority, would require the implementation of specific social scalability principles from a human-centered perspective. Some of the key mechanisms would include inclusivity, taking into account the needs and perspectives of marginalized and underrepresented groups; agency, giving individuals the resources and support they need to take control of their lives and shape their communities; transparency, to ensure that individuals and communities can understand how decisions are being made and hold those in power accountable; collaboration, encouraging individuals and communities to work together to solve common problems and achieve common goals; adaptability, for the system to be adaptable, capable of responding to changing circumstances and evolving over time to meet the needs of its members. These principles would help ensure that a human-centered social system can effectively manage growth and expansion, while maintaining its focus on the well-being and needs of individuals. They would also help promote greater equity, agency, and resilience within the system, supporting its long-term sustainability and success.

To promote self-organization and minimize the need for policies and regulations to enforce these principles, one approach is to incorporate them into the social architecture. However, this requires overcoming a number of challenges. Firstly, the challenge of freeriding or the behavior of benefiting from a shared resource, such as a public good or a common-pool resource, without contributing to its provision or maintenance; secondly, the challenge of horizontal trust or establishing and maintaining trust with peers at the interpersonal level and; thirdly, the challenge of vertical trust or establishing and maintaining trust with the hierarchical structure. The first challenge is to address individualistic actions that may harm the collective and lead to the "tragedy of the commons." The second one is to scale horizontal relationships based on trust

beyond a small group of individuals. The third one is to establish and maintain trust vertically across all levels of the social structure, not just at the micro level of individual relationships.

First, to address freeriding, we recommend using reciprocal or asymmetric exchanges that promote interdependence and encourage consideration of collective interest rather than individual gains. Second, we suggest establishing a few-to-few architecture that leverages trust transitivity and scale independence, enabling trust relationships to be extended to an unlimited number of participants. Third, we recommend bridging the gap between intersubjective trust and social structures through nested groups that provide a continuum of feedback loops between the micro and macro levels. Finally, we suggest revisiting complexity theory, as it may provide valuable understanding into the concept of self-organization and its potential application to human society, since human society is a complex system and evidence of self-organization can be observed in human groupings. However, complexity theory is not without its limitations and challenges when it comes to applying its insights and models to real-world social phenomena.

4.4 Freeriding and asymmetric exchanges

There are different types of economic exchanges, and they serve different purposes. Asymmetric exchanges aim to create a continuous relationship of mutual interdependence by establishing social debts between the parties that can never be fully repaid. In contrast, symmetric exchanges aim to extinguish any liability between parties once the exchange is completed, typically involving the exchange of goods or services for money. For example, relatives helping each other with no clear expectation of reciprocal favors is an example of an asymmetric exchange. The benevolence creates a perpetual social debt between them, establishing a continuous relationship of mutual interdependence. In contrast, buying groceries from a store is an example of a symmetric exchange. Once the transaction is complete, both the customer and the store have extinguished their liabilities to each other, and the transaction is considered finished. The social scalability mechanisms of Web3 stem from an understanding of relationships anchored in anonymity, competition, and therefore on symmetric exchanges. “Built on the premise of trustlessness, DeFi is inherently limited to the realm of wholly transferable private property (e.g., transferable tokens) that mostly bundles ‘usus’, ‘abusus’, and ‘fructus’” (Weyl et al. 2022, p. 17). The existence of a personal relationship is a key differentiator in the use of one or the other type of exchange. “Prices facilitate exchange when information is scarce and coordination is difficult. Conversely, reciprocal exchange has been preferred when trade involves personal interaction and when goods or services are unique, [...] or have many dimensions of quality” (Offer, 1997, p.450). The rich informational context provided by social networks can benefit asymmetric exchanges and put symmetric ones at a disadvantage.

For instance, measure-for-measure could at times feel awkward, or be interpreted as offensive within close relationships, resulting in a decay of trust and the deterioration of social ties. In close-knit communities, symmetric trade is therefore avoided, and reciprocal exchanges are not subject to stringent accounting. Social capital can be negatively affected by a lack of trustworthiness, emotional resonance, or reciprocity. Failure to meet expectations may lead to ostracism with direct or indirect collateral damage to peers. Because its interdependent outcomes bind it and because the act of giving gives rise to a kind of credit and, thus,

conversely, to a kind of debt, the dynamics of asymmetric exchanges have some of the characteristics of a contractual obligation mixed with an emotional bond. Communities built on asymmetric exchange may provide the necessary liabilities and affinities that distribute risks and opportunities so that the collective interest is systematically taken into account. Consequently, self-organization strategies based on either impersonal or personal interactions can drive either symmetric or asymmetric exchanges. Symmetric exchanges are managed by units of account such as currencies or tokens, effectively neutralizing liabilities between parties. As an example, DAO participants, who have no other interests tied to a particular crypto-community, can unilaterally terminate their relationship without incurring any additional liabilities, whether their actions are benevolent or malevolent. This inherent characteristic can lead to systemic instability because personal and collective interests are not aligned and to human distress because economic consequences are at stake. In contrast, asymmetric exchange maintains liabilities so that the social debt of pending favors acts as a social glue and as a powerful incentive to align interests. This approach represents an attempt to design an ecosystem of decentralized feedback loops on an ongoing basis for mutual assessment. Thus, by tapping into human and community-centered architectures rooted in asymmetric exchange, decentralized social scalability could forsake smart contracts in favor of wise agreements.

4.5 A transversal network for horizontal trust

Horizontal trust refers to establishing and maintaining trust with peers at the interpersonal level, and we see this challenge as twofold. Firstly, we need to provide an infrastructure that can extend trusted relationships beyond the cognitive limit known as the Dunbar number, enabling us to engage in trusted relationships with those who lie beyond our usual trusted horizon. Secondly, we need to coordinate with peers who hold equal power and cannot be compelled to act. We propose addressing this dual challenge through a 'network of networks' approach, on the one hand, and through social capital, on the other hand.

The network of networks³³ would translate as private networks limited to less than 150 people according to the Dunbar principle, and organized in a scale-independent, self-similar or fractal architecture to prevent growth in size.³⁴ By enabling the transitivity of trust, interpersonal trust can propagate from one network to another, leveraging the 'strength of weak ties' over time. This principle holds that acquaintances are more likely to be influential in bringing new opportunities than close friends (Granovetter, 1973). Therefore, individuals can act as gatekeepers to protect their peers' financial and social capital, as well as facilitate connections to curated opportunities as enablers, catalysts, or social bridges within their social clusters. Since each person is both at the center of their own private social network and at the edge of everyone else's, they play a critical role in defining social boundaries. Rather than viewing

³³ Groups are collections of individuals who share a common identity, purpose, or interest, with a defined structure, formal communication, and a central focus. Networks, in contrast, are sets of individuals or entities connected through relationships or interactions, more fluid and decentralized, with informal communication and no central focus.

³⁴ The word "fractal" was coined by mathematician Benoît Mandelbrot in 1975, from the Latin word "fractus", meaning "broken" or "fractured". Mandelbrot used the term to describe shapes or patterns that appeared similar at different scales, or magnifications. Fractals are used to model a wide range of phenomena, from the growth of plants to the patterns of weather and the behavior of financial markets.

boundaries as physical barriers, we see them as “functional, behavioral, and communicational interfaces that connect a system with its environment” (Cilliers, 2001, p. 5). As such, boundaries protect and enable, much like the eardrum. Our proposed network of interconnected private networks seeks to build on the existing rhizomatic chain of trust within the social fabric. Unlike other approaches that rely on “many-to-many” platforms to connect large groups of strangers and filter out trustworthy individuals, our strategy focuses on interdependent networks where everyone has been brought in based on trust and nested within encapsulating communities where everyone shares common interests. Trust and distrust can have ripple effects on local social capital, creating interdependence of outcomes, which makes it crucial to populate these networks with reliable and pivotal individuals. Thus, to address the issue of freeriding, it can be beneficial to implement an “immune system” at the network level that takes advantage of the interdependencies between collateral effects across different social groups. To enable decentralized human self-organization, we suggest adopting a new mindset that promotes creative tension through the idea of “Don't kill the middlemen; put them everywhere.”

The second method for fostering horizontal trust involves social recognition, which is achieved through the continuous practice of asymmetric or reciprocal exchange within the community. Social recognition contributes to social capital, which encompasses elements such as reputation, trustworthiness, and the ability to mobilize peers. Social capital can be reflected in private networks of limited capacity, or in “social portfolios” populated by peers who are recognized as being pivotal in an individual's accomplishments. They would have a dual advantage. Firstly, social recognition can be gained from very subtle or intangible social cues that might even escape individuals' awareness such as the propensity to express gratitude or to adopt a positive attitude that has the potential to inspire others. It can also benefit marginalized individuals or those with disabilities who would otherwise be outcompeted in the more traditional socio-economical landscape. Secondly, it could complement the monetary toolset where it is the least efficient, i.e. within a social landscape of personal relationships that favors asymmetric exchange. As such, social portfolios could become a basin of attraction for new peers to join in. The Dunbar-constrained size of these social portfolios would play a role similar to the scarcity of currencies within the realm of symmetric exchange.³⁵ Just as a wallet of money signifies wealth in the formal economy, a portfolio of peers and the ability to mobilize them signifies wealth in the informal economy. In a human-centered decentralized system, reciprocal exchange would best mediate community interactions and could represent an evolutionary dynamic in selection for synergy. Synergy means that activities are complementary so that together they make more resources available than if agents would be working on their own (Heylighen et al., 2022).

³⁵ Currency comes from the Latin root *Currere* meaning to run as in “current” or to flow as in “cash flow.” Currency is broadly defined as “a system of money in general use in a particular country” (Oxford dictionaries). Money, as “an object that is generally accepted as payment for goods and services and repayment of debts” with the functional aspect of being a unit of account, medium of exchange, and store of value. An ontological definition of money would be “an agreement within a community (or monetary zone) to use *something* as a means of exchange” (Lietaer, 2008). When referring to asymmetrical exchange, we do not mean barter, which assumes the double coincidence of wants, but rather the exchange of pivotal help that aligns unmet needs with unused resources without requiring significant investments of time or money. Reciprocity and asymmetric exchange are the “currency” of social capital, lacking the “unit of account” attribute. It could be described as a type of “current” that generates a “force field” for individuals who lead with “emotional resonance,” thereby attracting attention and resources.

4.6 Nested groups for vertical trust

Vertical trust refers to establishing and maintaining trust with the hierarchical structure and we see this challenge as twofold. Firstly, we need to create a continuum of feedback loops between the micro and macro levels through nested social groups so that there are no gaps in cooperation, coordination, and governance. The basis of this perspective is that interpersonal trust is a local phenomenon and one of a spectrum of interpersonal relationships that must foster accountability and adaptability, stretching from the micro level of the individual's subjective experience to the macro level of the social structure. Secondly, we would adopt resonant leadership as a result of constructive interference between the micro and macro levels. In decentralized systems, communities are seen as vital because users are allowed to indicate their preference at any moment by "voting with their feet." Indeed, and as exemplified by Web3, "given that cryptocurrencies are based on open-source code and switching costs are extremely low, cryptocurrencies are only as successful (and valuable) as the community that owns them and uses them" (Tomaino, 2018). While shared values, purpose, and resonant leadership may help maintain the strength and viability of decentralized communities, they remain relatively easy to enter, exit, and fork. It is less so for networks of trust that are based on personal affinities and reciprocal behaviors because social capital takes time to build. In fact, "once ties are set, they are not easily undone" (Granovetter 1985, p. 497). Trust as an expression of interdependence, emotional resonance as an expression of affinity, and reciprocal behaviors as an expression of shared interests help align incentives and extend liabilities between individual and collective levels. Therefore, we suggest that such networks of trust become the underlay on which informal interest groups and formal communities of practice are built at a range of social scales, up to the macro level of the social structure itself. These transversal networks of affinities and nested social groups are believed to be instrumental in igniting positive feedback loops between personal and collective accountability and then ensuring end-to-end trust, emotional resonance, and reciprocity from the micro to the macro scales.

"To be specific, the development of new social systems must be based on the emergence of a new macro-level trust architecture. In order to define this new trust architecture, we assume that foundations of micro-level emotional resonance would create the conditions for preferential attachment where one contingently links and associates with others who have similar interests and aims (desires, beliefs, intentions). In other words, the foundations of emotional resonance lead to an appeal to attunement and awareness that the substructure of the social system is based on psychical drives. From this, we assume that reciprocity would reinforce these initially contingent links and associations and allow for the solidification of a metastable form of trust where horizontal accountability can become increasingly robust across time. Reciprocity assumes a perpetual social debt that is constantly holding the field in a mutual interdependence. This field is something that becomes possible to hold with first-hand sensory information (personal relations) over second-hand symbolic information (money, reputation), in part due to reflective self-change on the side of the micro-level psychical systems and in part due to structural design change on the side of the macro-level social system" (Last et al., 2018).

Social recognition, social capital, and resonant leadership are all interrelated concepts that would play a crucial role in shaping the effectiveness and success of decentralized social

systems and organizations. Social recognition refers to the recognition and validation that individuals receive from others in their social network. This recognition can take the form of acknowledgement, social status, or respect and is a crucial factor in shaping an individual's self-esteem, well-being, and sense of belonging. Social capital refers to the resources, networks, and relationships that individuals can draw on in their social network. This can include things like trust, knowledge, and reputation, and is a crucial factor in shaping an individual's ability to achieve their goals and navigate the social system. Resonant leadership refers to a style of leadership that focuses on creating a deep connection with followers and fostering a sense of shared purpose and vision. This style of leadership is characterized by empathy, emotional intelligence, and the ability to inspire and motivate individuals through resonating with their needs, values, and aspirations.

Resonant leaders aim to create a positive and supportive work environment, where individuals feel valued, appreciated, and empowered. They work to build strong relationships with their followers, understand their needs and motivations, and leverage these insights to create a sense of shared purpose and direction. Resonant leaders are those “who exhibit attributes of emotional and social intelligence, are better able to connect with others most effectively, and so lead well” (Goleman, 2007). This style of leadership is in contrast to more traditional, transactional leadership styles, which focus on exchanging rewards and punishments to motivate followers. Instead, resonant leaders aim to create a sense of connection and meaning that goes beyond simple incentives and rewards. Resonant leadership has been shown to be effective in a variety of contexts, including businesses, non-profit organizations, and government agencies. It has been linked to higher levels of employee engagement, job satisfaction, and organizational performance, and has been shown to be particularly effective in fostering a culture of innovation, creativity, and collaboration. When there are no formal enforcement mechanisms in place, such as laws or institutions, resonant leaders can still ensure that norms and rules are followed by the group. This is because their influence and persuasive abilities are rooted in their emotional resonance with the group, rather than external means of enforcement. As a result, their followers are more likely to comply with norms out of loyalty and respect for the leader, rather than due to fear of punishment. In this way, resonant leaders can help to maintain order and stability within a community, even in the absence of formal enforcement mechanisms.

The relationship between social recognition, social capital, and resonant leadership is that they collectively shape the effectiveness and success of social systems and organizations. Social recognition and social capital help create a supportive and empowering environment, providing individuals with the resources and validation they need to thrive. Resonant leadership, in turn, leverages these resources to create a sense of shared purpose and direction, helping to align and mobilize individuals towards common goals. In this way, social recognition, social capital, and resonant leadership work together to support and reinforce one another, creating a positive feedback loop that can drive the success and sustainability of social systems and organizations. By fostering these three interrelated components, leaders can create more effective, resilient, and empowering social systems that better meet the needs and aspirations of their members.

5. Conclusion: Relationships are all there is

The world is currently facing a historic turning point, characterized by numerous societal changes and challenges. These include the Fourth Industrial Revolution of information technology, the Great Reset of international organizations, the new Bretton-Woods moment of monetary institutions, the end of the Pax Americana, the rise of a multipolar world order, and various grassroots movements for social justice and environmental preservation. These changes are taking place against a backdrop of a number of historical precedents for social turmoil, such as high taxes, sustained inflation, persistent debt, high food prices, economic disparities, a lack of political reform, and an inability to solve problems.³⁶ These factors are exacerbated by a dysfunctional financial system that is leading to an "everything bubble," macroeconomic strains, supply chain disruptions, skyrocketing energy prices, political polarization, cultural and gender wars, demographic change, global pandemics, warfare escalation, cyber attacks, nuclear threats, terrorism, rapid technological change, artificial intelligence and the viral spread of synthetic information, climate-induced events, mass migration, anthropogenic hazards,³⁷ and the strain of exponential economic growth on finite resources. These challenges have combined to form "wicked problems" and a polycrisis that exceeds the capacity of current social institutions, creating a path that has never been walked before.

As a society, we have traditionally relied on two main social technologies to address challenges: the hierarchical institution and the competitive market. However, there is a non-zero probability that our current centralized institutions may be ill-equipped to handle new challenges that arise. Furthermore, the competitive market is not always effective in addressing socio-economic disparities or environmental concerns. As old certainties begin to falter, there is a growing call for social renewal and a need to redesign social systems with fail-safe mechanisms that can enhance our overall resilience. Inevitably, social concerns raised by emerging technologies like Web3, which represent a form of social distrust toward the current social order, will become a political initiative when societal change becomes unavoidable (Gilens and Page, 2014). As the gap widens between what the public expects and what governments can deliver, a new social force that can coordinate its actions creatively will undoubtedly fill the power vacuum left by the ruling class's structural inability to handle new demands, concerns, and expectations. According to the National Intelligence Council (2021), "During the next two decades, these multiple paths for channeling discontent are likely to present an increasingly potent force with a mix of implications for social cohesion."

The mix of concerns, social unrest, and new technology is a formula for change, especially when that technology is the Internet, one of the most significant innovations in human history.

³⁶ French revolution. In *Wikipedia*. Retrieved May 31, 2022, from https://en.wikipedia.org/wiki/French_Revolution

³⁷ "It was among the strongest feelings of grief I have ever encountered. The contrast between the vicious coldness of space and the warm nurturing of Earth below filled me with overwhelming sadness. Every day, we are confronted with the knowledge of further destruction of Earth at our hands: the extinction of animal species, of flora and fauna... things that took five billion years to evolve, and suddenly we will never see them again because of the interference of mankind. It filled me with dread. My trip to space was supposed to be a celebration; instead, it felt like a funeral" (Shatner, 2022). Retrieved October 10, 2022, from <https://variety.com/2022/tv/news/william-shatner-space-boldly-go-excerpt-1235395113/>

Hyperconnectivity networks have supercharged global interconnectedness, sealing our global interdependence while creating a body of knowledge previously unseen right at our fingertips. We have been able to determine the scale, scope, and urgency of problems as well as the resources to address them. Yet, the fact that this easily accessible collective intelligence and the awareness that something has to be done do not result in widespread collective action is startling. We recognize that our attempt is inceptive, that we are far from having all the answers, and that we need to learn from each other. The information revolution provides a background that systematically favors “network” forms of organization and erodes traditional hierarchies. So, we think that structural change is inevitable, that instability will come before stability, and that the future of social organizations will be a little challenging, at least for a while.

To make sure that order doesn't turn into harsh forms of control and that chaos doesn't lead to collapse, we need to find a middle ground that lets us all walk that thin line between order and chaos.³⁸ In other words, we need to give rise to the social web's true expression, the collaborative network. But then, we will need to crack the code of decentralized social scalability that is human-centric. To some, code is superior because the idea of trust is naive, arguing that a smile on the face will never prevent a stab in the back. However, code is an abstraction and thus a reduction, which cannot capture the immateriality of trust or replace interpersonal relationships. Despite the fact that trust has been the default for social interactions since time immemorial, it is yet to be adapted to the online world. And we adopt the perspective that “technology could largely mold the ways in which people meet and interact” (Porter et al., 2012, p. 24).

We agree that the idea of emergent structures and letting go of control is unsettling. But, as a society, we might only have two options in the face of uncertainty. Either the status quo of hierarchical institutions coupled to the logic of the competitive market, or the addition of a new type of social organization, the collaborative network. One will prioritize control over freedom, the other flexibility over control. Social technologies reduced to the combination of institutional actors and competitive markets alone are discommoding. Legacy institutions are to maintain social order in the case of upheaval, yet their rigid hierarchical structure limits them to applying one-size-fits-all solutions. Besides, today's panoptic surveillance, coupled with the potency of programmable money, both rooted in the extractive logic of the market, outline a bleak future for mankind. It is thus a question of personal choice and collective responsibility. Do we really wish to continue business as usual, sleepwalking into the unknown, pointing fingers, and testing the depth of the river with both feet? What is the chance that “overwhelmed by the disorder consequent to our atomization, we might cheerfully surrender all our rights to an authoritarian power and subsequently behave in a docile manner?” (Granovetter, 1985, p. 485). In that scenario, democracies will be at best “managed” and rights will be nominal. Is this going to be our legacy, and are we going to flee into off-grid smallholdings to alleviate the loss of social freedom or retreat into digital abundance to compensate for material frugality?

Another course of action is to realize that if decentralization and technology are instrumental in bringing a renewal of social systems, they are just tools. The crux of the problem is relational in

³⁸ We also understand chaos as “the property of a complex system whose behavior is so unpredictable as to appear random, owing to great sensitivity to small changes in conditions” Oxford dictionaries.

nature. Next to technological and monetary innovations, we need a relational fix, and there is no escape from recreating a new relationship with ourselves, others, and the planet. “What is really changing in the world is not technology, or the globalization of capital, but the relationships between people, relationships that were once hierarchical and based on the force of authority. This has been radically flattened. What matters most now are the connections between people, the interdependencies and networks that can be formed, and the unimpeded flow of information” (Greene, 2010). This new relationship involves an openness to new ideas, to individual autonomy, and enduring exploration, and a move from outraged polemic to constructive debate.

Let us recall Oscar Wilde’s saying that “Every saint has a past, and every sinner has a future.”³⁹ We might then want to recognize that if others have limitations, we too have them. Then might come the recognition that we are all trying our best in a world that is confronting, that nobody holds the truth, and that we actually need each other, even for selfish reasons. “The biological reality of self-preservation leads to virtue because, in our inalienable need to maintain ourselves, we must, of necessity, help preserve others” (Damasio, 2003, p. 171). Therefore, we need everybody on board, and all hands must be on deck. It seems like the right time to add the new social scalability toolkit of the collaborative network to our social operating system. Leveraging collective action, providing economic support and political agency while respecting the people and the planet is available to us. For, in the end, we can only acknowledge our individual vulnerability and, thus, the nature of our ultimate interdependence, which is reflected in the quality of our relationships. “The real disruption taking place is not technology; it’s a trust shift that will open the doors to new and sometimes counterintuitive ways of designing systems that will change human behavior on a large scale” (Botsman, 2016).

³⁹ Quote from Oscar Wilde, 19th century Irish poet.

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“An absence of perspective can be devastating in its consequences. It can, for example, lead to a situation in which the dominant species of a planet — the only one known to be inhabited — located in a remote backwater of the universe, can indulge in its darkest, most reckless and destructive impulses, plunging the world into chaos and threatening the very survival of its only home and the continued existence of every life form that has the misfortune to share the same sky and breathe the same air [...] Perspective can be recovered, even in the most unpromising of circumstances. In a world that is facing unprecedented peril and unimaginable challenges, the key to its survival is an acknowledgement of the beauty, purpose and patterns discernible in the universe; of the interconnectedness of all things; and of the need to restore balance” Stephen Ellcock - The Cosmic Dance.

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