Principles & Models of Web3 Decentralization[1]

Overview

Despite many examples in history of effective decentralized political systems, cultures and businesses, the predominant perception of decentralization is that it is inherently fragile when confronted with the utilitarian effectiveness of centralization. The reason for this is simple and intuitive, one voice is more effective than many when it comes to clarity in decision making. Uniformity in vision and clear delineation of authority are powerful tools when creating laws, products, strategy and infrastructure because they avoid duplication of efforts and harness creative vision towards accomplishing shared objectives. In contrast, decentralization requires communication and compromise. Whereas in a centralized system a dissenting party may not like the decision that has been made, in a decentralized system a dissenting party may be able to keep a decision from being made at all. Consequently, decentralized systems have historically been thought of as local, small scale or regional solutions: when accounting for large numbers of decisionmakers, geographical location and the ability to effectively communicate, decentralization presents obstacles that centralization does not.

Unfortunately, the efficiency and stability of centralization comes at a price. Encroachments on personal freedom, choice and privacy are inherent when control is held in the hands of so few. We have seen this reality shape the internet, a tool whose essential value is the networks (the connections) it enables. The open and decentralized protocols that first created these networks in web1 have long been surpassed by sophisticated products and services created and controlled by centralized gatekeepers. This tradeoff may have once been necessary, as such products and services were built from the ground up utilizing proprietary technology that required significant capital to develop and captive systems to protect. But, technological progress rarely stagnates, and any benefits of these tradeoffs are becoming increasingly costly.

The development of programmable blockchains, composable smart contracts and digital assets provide us with the opportunity for a new paradigm. While these technological advancements do not solve the challenges of collective decision making, they are a powerful tool for coordination and, more importantly, they provide builders with the tools necessary to create decentralized digital infrastructure that can generate and be supported by robust decentralized economies. Upon this decentralized and shared infrastructure, products and services can be built that rival and surpass the products and services of today's centralized systems and that could ultimately secure our fundamental freedoms. It began with a single decentralized blockchain network, grew into the decentralized products and services known as "DeFi", and is now expanding into a version of the internet that will be built on decentralized infrastructure.

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An abridged version of this paper can be found at a16z.com/decentralizationforbuilders.

While this concept of web3 is just beginning to take shape, its success depends upon its ability to deliver the self-empowering benefits that decentralization makes possible. Significantly, these include more equitable ownership among stakeholders, reduced censorship and greater diversity. As web3 moves to disrupt increasingly sophisticated web2 products and services, it is necessary to evolve our understanding of the core tenets of decentralization in order to apply them to these more complex systems. In the furtherance of this objective, much insight can be gained from the study of successful decentralized blockchain networks and smart contract protocols that have forged a path to decentralization, as well as the technical, economic and legal developments accompanying the growth of web3.

This paper is intended to provide builders, observers and new entrants to web3 with a broader understanding of decentralization, including its challenges and its promise. It is composed of three parts: (1) a framework for web3 decentralization; (2) a review of how the novel components of web3 systems can be used to achieve decentralization; and (3) an analysis of several models of decentralization and how they apply in practice.

Framework for Web3 Decentralization

Few topics in web3 are as expansive as decentralization, so it is important to begin with a framework for discussing its role in web3 systems. As a construct, decentralization is an abstract term because it gains its meaning as a comparison to centralization and the degree to which decision-making has been distributed away from centralized mechanisms. Without further exploration, decentralization is simply a measure by which one can evaluate the degree to which any process is centralized.

Subsidiarity is a concept contained within decentralization, which states that decisions should be made in the least centralized manner that is still effective. This principle speaks to finding a balance between collaboration and integrative decision making with the efficiency and uniformity that is inherent to centralized decision making. Although some systems will always be best suited to centralization, we expect the propagation of programmable blockchains and smart contract protocols to provide robust and efficient systems of decentralization upon which both decentralized and centralized products and services can be built.

The effectiveness of these decentralized web3 systems will depend upon their security, economies and parity of information. Accordingly, our analysis focuses on decentralization in the context of web3 and categorizes it into three distinct categories to further its application.

- ***Technical Decentralization*** *– primarily relating to the security of web3 systems*

  At a fundamental level, decentralized blockchains and smart contract protocols provide for a permissionless and verifiable ecosystem on which web3 products and services can be built without the need for trusted central intermediaries.

- ***Economic Decentralization*** *– primarily relating to the economies of web3 systems*

  The advent of programmable blockchains (such as Ethereum) and digital assets unlocked the possibility of decentralized systems with their own decentralized economies that encompass trade, services and accumulation (or loss) of wealth.

- ***Legal Decentralization*** *– primarily relating to the legality of web3 systems*

Decentralization has implications for a wide array of legal issues, including with respect to taxation, liability, ownership, intellectual property, reporting and privacy. However, we focus on the intersection of decentralization and U.S. securities laws, which is critical to understanding how decentralized systems may make use of digital assets.

The interplay amongst these categories is significant, with limitations in one category directly impacting the others.[i] As a result, all three elements of decentralization should be considered as a single design challenge, with technical decentralization providing a foundation upon which both economic and legal decentralization can occur. Given the intricacies of the relationship between economic and legal decentralization, this paper provides additional background on economic and legal decentralization and then analyzes how they relate to one another.

Decentralized Economies of Web3 [ii]

One of the key advantages of web3 systems is that they facilitate the formation of decentralized economies, which are autonomous free-market economies that are not controlled by any centralized authority. These economies enable self-regulated capitalism, accruing value (*e.g.*, information, economic value, voting power, etc.) from a broad array of sources and equitably distributing it amongst such system's stakeholders. Web3 systems initially achieve this by vesting meaningful power, control and ownership in their stakeholders (via airdrops, other token distributions, decentralized governance, etc.), and maintain it by balancing the incentives of such stakeholders. While the lack of centralized control means that decentralized systems are often less efficiently organized than centralized systems, it also means that they are not reliant on, or subject to, the abilities, powers or conventions of an individual or leadership group.[iii] This structure encourages stakeholders to contribute meaningful value by providing them agency over how their contributions are treated and rewarded. For instance, it frees developers from the concerns they often experience when building products in web2, including corporate actors changing the rules for participating on the platforms they control whenever it suits the corporation's interests. The balancing of incentives among the stakeholders of web3 systems (including developers, contributors and consumers) then drives further contributions of value to such systems to the benefit of the community and the builders.

Compare this to the centrally controlled economies of web2 systems, which rely on the concentration of power and hierarchal decision-making and execution to drive value. While this construct can be efficient, that efficiency comes at a significant cost. Not only are centralized systems bound by the conventions and abilities of those that control them (including, officers, directors, shareholders, interest groups, regulatory agencies and governments), they often focus on maximizing returns for such controlling parties to the detriment of users, including contributors and other non-centralized stakeholders. In web2, this is evidenced by the prioritization of captive and closed systems that require users to sacrifice ownership of and autonomy over their digital world (social media posts, followers and photos, media licensing, applications, etc., all remain locked within these systems).

In addition, the strong positioning of many centralized platforms has enabled them to utilize their captive systems to force their conventions on users and apply extraordinary take rates, disincentivizing innovation and creation on those platforms, ultimately driving web2 towards greater homogeneity. Further, as these platforms continue to pursue growth, they scale their

efficiencies and extract greater value from users beyond just simply profiting from their contributions. In essence, many web2 platforms have aggressively utilized monitoring, content curation and data collection, to turn their users into a product that is sold continuously and often without their knowledge (*i.e.*, the ad-based revenue model). As a result, we see web2 social media platforms designed to maximize engagement through the use of algorithms that amplify sensationalist content. Meanwhile, we can imagine a web3 social media platform unencumbered by web2 business models and free to explore more measured and diverse approaches to content and engagement.

A real-world example of the dichotomy between decentralized and centralized economies can be seen in a comparison of the Ethereum blockchain to various web2 systems. Ethereum is a decentralized programmable blockchain upon which hundreds of smart contract protocols and applications have been built and deployed without any permissions required and without any take rates applied by a central authority. Decentralized finance protocols built on Ethereum had amassed over $150 billion of deposits as of the start of 2022 and purchases of NFTs (*i.e.*, digital property) totaled over $17 billion in 2021.[iv] The willingness of developers to build these protocols and the willingness of users to deploy capital to them and acquire assets on Ethereum is not driven by trust in Ethereum or its protocols, it is driven by the fact that decentralization obviates the need for trust altogether. No central authority can change the rules by which Ethereum or those decentralized protocols operate, nor can any individual seize control of a consumer's tokens or NFTs. In addition, interchain infrastructure will enable all of these digital assets to be portable to other blockchains, making the digital property of users transferable to other ecosystems.

Meanwhile, many of the most well-known web2 platforms apply enormous take rates (from 30% to 100%) to the developers, artists, musicians, content contributors, local businesses and gig economy workers that make their ecosystems profitable. Their captive systems often do not enable contributors or consumers to easily move their contributions, purchases, preferences or data to other systems, and it is increasingly common to see stakeholders be de-platformed. As such, developers, contributors and consumers are forced to place significant trust in these platforms to not only continue to develop and operate products and services that consumers want but do so without increasing their fees or arbitrarily de-platforming stakeholders. Given the erosion of trust that has resulted from web2 models maximizing profits at the expense of developers, contributors and consumers, the decentralized economies of web3 offer a compelling alternative to the centrally controlled and captive economies of web2.[v]

Although decentralization has been essential to the development of the internet in general, the sophisticated products and services of web2 have dominated the decentralized protocols that gave birth to web1 (*e.g.*, http, smtp, ftp, etc.). However, the superiority of centralized systems giving rise to distortion of control and ownership is not inevitable, nor necessarily durable. The web2 systems that permeate the internet today have all capitalized on the efficiency of centralized systems, while the decentralized open protocols of web1 have been constrained by technological limitations at the time of their creation and were never able to take advantage of fully functioning decentralized economies. Programmable blockchains enable far more sophisticated and complex decentralized systems to be built without trusted central intermediaries and digital assets are now able to align incentives to drive truly decentralized economies around such systems.

Legal Decentralization and U.S. Securities Laws

U.S. securities laws currently dictate how and whether a system may make use of its own digital assets in the United States. Such laws are primarily designed to protect investors investing in securities and ensure the efficiency of U.S. capital markets. One of the primary tools they use to achieve this is the application of disclosure obligations to issuers of securities, as well as to certain other parties that transact in securities.[vi] This is intended to create a "level playing field" for transactions in securities by limiting the ability of market participants with more information taking advantage of those with less information. This is the principal of information asymmetry and eliminating such asymmetries is, for example, the reason that companies are required to provide substantial public disclosure about their businesses, financial condition and results of operations when they offer securities to the public (for instance, in an IPO).

In 1946, the U.S. Supreme Court established in *SEC v. W.J. Howey Co.* the basis for applying securities laws (and their disclosure requirements) to transactions involving "investment contracts" which are the type of instrument the SEC most commonly attempts to compare digital assets to. As stated by the Supreme Court in *Howey*, applying securities laws to transactions of investment contracts "…permits the fulfillment of the statutory purpose of compelling full and fair disclosure relative to the issuance of 'many types of instruments that in our commercial world fall within the ordinary concept of a security.'" To determine whether an instrument was issued as an investment contract (*i.e.*, a security), the Supreme Court established the *Howey* test, which stipulates securities laws should apply to investment contracts where (1) there is an investment of money (2) in a common enterprise (3) with a reasonable expectation of profit (4) primarily based upon the managerial efforts of others.[vii]

While there is not codified standard for "legal decentralization," a practical standard can be drawn from the fourth prong of the *Howey* test. The definitive guidance in this regard to date is the SEC staff's April 2019 guidance titled "*Framework for the Investment Contract Analysis of Digital Assets*" (the "2019 Framework"), which justified the applicability of disclosure requirements to certain transactions in digital assets in order to protect investors from significant informational asymmetries that could exist between management and the enterprise on the one hand and investors and prospective investors on the other. In addition, the 2019 Framework provides a number of factors about the type of management activities that might satisfy the fourth prong of the *Howey* test due to the potential creation of significant informational asymmetries. Similarly, the 2019 Framework suggests that a decentralized network with an "unaffiliated, dispersed community of network users" (*i.e.*, decentralization) may point away from the application of securities laws.[viii]

As a result, many have posited that a system may be legally decentralized if it is "sufficiently decentralized" such that the application of securities laws to the digital assets of such a system should be unnecessary.[ix] Moreover, if an enterprise is so decentralized that it operates without a central controlling entity or management team, it would be difficult (or impossible) to establish an issuer or registrant for purposes of SEC filings and registration, making the application of securities laws impractical. Although such decentralization might not be possible for most businesses, it is not only possible for many web3 systems, but also essential to their function. As will be discussed in further detail below, the technology that underpins web3 shifts the value of

web3 businesses such that they ultimately look much more like networks than traditional businesses, and networks are inherently more diffuse and open to decentralization.

Based on the foregoing, web3 systems may be deemed to be legally decentralized where (i) information regarding their operation is transparent and available to all (enabled by transparent blockchain ledgers) and (ii) no essential managerial efforts are necessary (or even possible) to drive the success or failure of the enterprise (enabled by immutable smart contracts, decentralized economies and DAOs).

Relationship Between Economic & Legal Decentralization

Through the foregoing framework, we can see how the characteristics of decentralized economies drive systems towards legal decentralization. Because decentralized economies prioritize decentralized ownership among stakeholders, value accretion from decentralized sources and value distribution to decentralized stakeholders, the risk of information asymmetries and the need for managerial efforts of individuals decreases as systems become more economically decentralized.

To clarify the overlap and complimentary relationship between the concepts of economic and legal decentralization, consider the following example of the decentralization of a web3 marketplace that utilizes a native governance token to incentivize developers to add features to the marketplace and to incentivize buyers and sellers to engage in trading activity.

For the marketplace's decentralized economy to function, it needs to properly balance the distribution of the value it accrues (*e.g.*, information, economic value, voting power, etc.) to its stakeholders (developers, buyers and sellers). Any significant and sustained imbalance in this arrangement may jeopardize the system's economy. For instance, because the native governance token is utilized as an incentive mechanism in the functioning of the system's economy, an imbalance in the accrual of information relevant to the value of the native governance token (such as information relating to the functioning of the marketplace) could enable a party to manipulate the market for their own benefit. Similarly, an imbalance in the accrual of voting power could enable a party to change the rules of the marketplace for their own benefit. Finally, if the economic value the marketplace accrues is not equitably distributed among its stakeholders, a disfavored constituency may depart for other competitive marketplaces. While the decentralized economy of the marketplace may survive isolated imbalances in the short term (particularly if they advantage benevolent actors), in the long term these imbalances would ideally be removed to prevent them from being exploited.

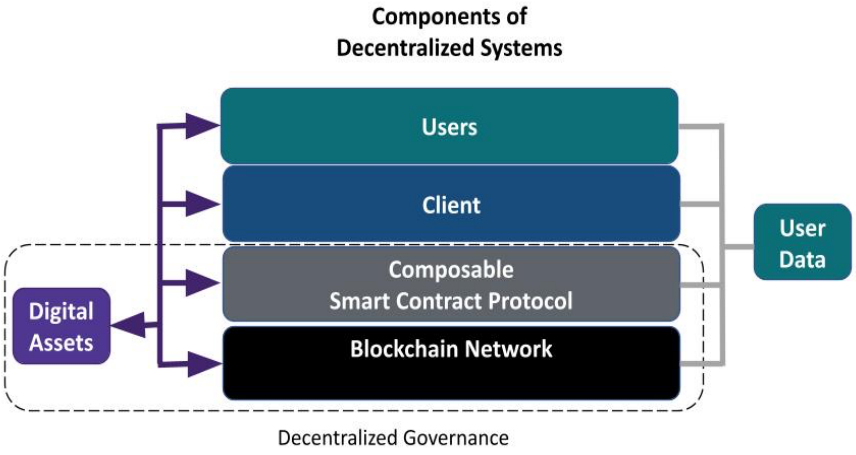
Meanwhile, legal decentralization would necessitate that the marketplace reduce the risk of significant informational asymmetries arising and eliminate any reliance on essential "managerial efforts". As above, information asymmetries can destabilize decentralized economies, so designing the marketplace to reduce the risk of them arising would also be beneficial to the functioning of its economy. The marketplace's reliance on "managerial efforts" would be most likely to occur at the outset of its decentralization, where the efforts of the developer corporation that launched the marketplace might include ongoing development work or activity as a buyer/seller in the marketplace. By filling roles that independent market participants have not yet filled, the developer corporation's efforts may initially be beneficial to the marketplace's economy. However, the perpetuation of any reliance on such efforts is ultimately a drag on the marketplace's

economy as it requires the other market participants to trust that such efforts will continue. As with economic decentralization, legally decentralized systems should prioritize a design that does not rely on a central trusted intermediary and that can thrive through the efforts of the broad community of participants.

As a result of the foregoing dynamic, within complex systems, economic decentralization is generally considered to be a prerequisite to legal decentralization. The elimination of reliance on a central trusted intermediary and the achievement of legal decentralization by a web3 system then enables it to utilize native digital assets, including to effectively manage and stimulate its decentralized economy, thereby contributing to greater economic decentralization. Together, economic and legal decentralization enable decentralized economies facilitated by digital assets to form around decentralized systems. This is one of the most critical technological breakthroughs of web3, as it positions open source and decentralized systems to compete with the closed and centralized systems of web2.

The Components of Web3 Systems

Through the lens of the foregoing decentralization framework, we can then analyze how the novel components of web3 systems can each be utilized to support decentralization. In particular, we review: (i) blockchain networks and smart contract protocols; (ii) digital assets; and (iii) decentralized governance.



Blockchain Networks and Smart Contract Protocols

As previously noted, blockchains and smart contract protocols can support technical decentralization by providing a permissionless, trustless and verifiable ecosystem in which value can be transferred and upon which web3 products and services can be built. These are the core innovations of programmable blockchains. Products and services can now be deployed and run without the need for a central party to operate them, opening a vast world of possibilities, including community empowered applications that need not rely on algorithmically driven ad programs to make them economically viable. In addition, public blockchains and smart contract protocols support decentralization by (1) enabling transparency; (2) being open source/public goods; (3) enabling data portability; and (4) being composable.

Transparent

First, blockchains with publicly accessible ledgers inherently support economic and legal decentralization, as the transparency of the on-chain information mitigates the risk from potential informational asymmetries. For example, anyone can currently view which DeFi protocols on Ethereum are most often used, where the most digital assets have been deposited and where the most fees are being earned. Even with NFTs, the data is publicly available, and we have built tools to help more people, not just data scientists, analyze this data and build their own models as well. As a result of this transparency, no individual, regardless of what historical ties or positioning they have with respect to any such protocol, will have greater access to information about the financial condition or results of operations of such protocol than what is already publicly available.[x]

Open Source

Second, it is generally accepted that the blockchain networks and smart contract protocols of web3 systems need to be open source for such systems to be decentralized. This is thought to be an imperative both for purposes of the security of such systems, as well as to foster the decentralized economies of such systems. In particular, the transparency associated with open-source technology means that anyone is free to use and test its functionality to ensure its safety.

Making the technology open source also means that the fundamental building blocks of such systems are not owned or controlled by anyone, and no individual or group is able to shut them down or curtail their use. Even if an individual or group did aim to do so, other users could simply "fork" the technology (*i.e.*, effectively copy and paste the code) and continue to use it as they wished. There is some debate as to whether enabling third parties to "fork" a network or protocol also furthers decentralization. If parties are not free to "fork", then it is difficult to say whether the system's value is its intellectual property or its network. Conversely, if parties are free to "fork", the continued success of the original system signals that the network is the true driver of its success.

Overall, the lack of centralized control directly supports the system's legal decentralization under the 2019 Framework. In addition, it indirectly encourages third parties to build on top of what others have already created, either by building new layers or by building clients that utilize them, a critical component of the broad value creation that is necessary in a functional decentralized economy.[xi]

Data Portability

Third, while web2 companies are incentivized to build and operate captive systems in which they retain ownership of user data, purchases and content, blockchain ledgers and wallets generally reverse this paradigm by enabling data portability. In particular, web3 systems enable users to retain control of their data, purchases and content, all stored in their wallet.[xii] This means that rather than build closed systems, web3 companies have to build open systems that allow for greater mobility and interoperability across web3 products and services.[xiii] This new paradigm is further supported by non-fungible tokens, which expand the application of property rights to the digital world, enabling users to move their digital property from one ecosystem to another. Collectively, data portability and digital property rights lower switching costs, which has the effect of reducing the economic power and overall control held by developers of web3 systems. This

shift supports the decentralization of web3 systems by making users a much more important component of the value of web3 systems. In web3, the user, not the platform, is king.

Composability

Fourth, programmable blockchains that prioritize composability further reduce the power and overall control held by developers and increase overall economic decentralization. They achieve this by enabling developers to create new products and services utilizing the smart contracts of existing products and services as building blocks. This reduces the amount of work necessary for developers to undertake to create new products and services, essentially lowering the barrier of entry for web3.[xiv]

Digital Assets

The decentralized economies of web3 systems are driven by a combination of their intrinsic incentives (the system's ability to trigger a third-party's innate desire to participate in such system based on its underlying characteristics - user base, network effects, technology, etc.) and extrinsic incentives (digital asset distributions, revenue sharing, etc.). Of these, digital assets are the most critical tool that web3 systems have to facilitate the formation and ongoing functioning of their decentralized economies.

Given that the use of digital assets by a web3 system may be predicated on such system being legally decentralized, it is useful to consider how the balancing of such incentives among its stakeholders can help to establish and reinforce the legal decentralization of such system. In other words, the interplay between economic decentralization and legal decentralization. As discussed above, in the 2019 Framework the SEC provided a number of factors relevant to the analysis of whether a network was legally decentralized. Many of these factors emphasize the role that developers play in web3 systems. For example, whether an "active participant" is: (i) is responsible for the development, improvement (or enhancement), operation, or portion of the network or is responsible for essential tasks; (ii) creates or supports a market for, or the price of, a digital asset; or (iii) has a lead or central role in the direction of ongoing development.[xv]

However, this emphasis on developers is more appropriate for web2 systems, where centralized economies are controlled by developers and where developers use proprietary and captive systems. As discussed above, in the open source, data portable and composable systems of web3, the value of the technology contributed by developers decreases and the importance of the network effects created by contributor and consumer participation increases. As a result, a web3 system's value is less about the products and services it provides, and is more about its network of developers, contributors and consumers.[xvi]

Numerous examples already exist where the balancing of intrinsic and extrinsic incentives among developers, contributors and consumers has facilitated the formation and ongoing functioning of decentralized economies, thereby driving legal decentralization. For instance:

- *Incentivizing Developers* – To date, the best example of intrinsic incentives generating substantial development work within an ecosystem is Ethereum and the DeFi protocols that were built on top of it without any extrinsic token incentives. The vast majority of these protocols were built as a result of the safety of Ethereum's network as well as its network effects (*i.e.*, users), and the creation of these protocols has contributed greatly to

Ethereum's overall decentralization. Meanwhile, much of the expansion of DeFi to other blockchain networks has been successfully encouraged through a combination of similar intrinsic incentives (*e.g.*, user growth, total value locked, decentralization, security) coupled with extrinsic token incentives from the underlying network. Similar combinations of extrinsic and intrinsic incentives are also being successfully used to incentivize the development of gaming projects and NFT projects on various blockchain networks.

Regardless of the differing combinations of incentive mechanisms, the development of additional products and services by an increasing number of sources contributes to the decentralization of the economies of the underlying blockchain networks. Finally, there are comparably few examples where extrinsic token incentives alone (such as through grant and rewards programs) were sufficient to drive meaningful contributions of value from developers to existing protocols (with Gitcoin's retroactive award program being one of the most significant exceptions)[xvii], though DeFi protocols are continuing to experiment with many different types of incentivization mechanisms.[xviii]

- *Incentivizing Contributors* – Numerous DeFi protocols explicitly incentivize users to contribute digital assets to their liquidity pools by rewarding them with native token awards, thereby providing a meaningful source of value to such protocols, as such digital assets are then used in the products and/or services offered by such protocols. The importance of these contributions cannot be understated, with "total value locked" (a measure of such contributions) being one of the key metrics upon which such DeFi protocols are valued. Similarly, intrinsic incentives play a significant role for many DeFi protocols. For example, contributors seeking to earn income by providing liquidity to a decentralized exchange's liquidity pool will seek out the exchange with the most users and most trading activity. Beyond DeFi, one would expect to see contributors (influencers for social media, artists for NFTs, etc.) play meaningful roles in the value accretion of web3 systems in exchange for digital asset-based incentives, thereby contributing to their overall decentralization.
- *Incentivizing Consumers* – Within DeFi, there are also numerous examples of protocols that have used extrinsic incentives in the form of token awards and airdrops to incentivize users to use such protocols, such as rewards for swapping on a decentralized exchange. However, the most successful examples of consumer-based incentives abound in play-to-earn video games, where developers are experimenting with extrinsic incentives in the form of distributions of fungible and non-fungible tokens to incentivize players to participate. Meanwhile, NFT projects have successfully used a combination of intrinsic incentives (social value in displaying an NFT as a profile picture, community activities, etc.) and extrinsic incentives (the appreciation in value of the NFT resulting from ancillary projects launched for the NFT's community) to attract consumers. The incentivization of consumers for the value they provide these systems is economically rational. Without consumers, these video games and NFT projects would not succeed and accordingly, these projects have concluded that the incentives awarded to consumers will ultimately be exceeded by the value they create in stimulating the economies of these systems.

If successful, the use of digital assets to balance the incentives of developers, contributors and consumers, can result in a flywheel of network effects. Network effects are where the overall system becomes more valuable to more users as more people participate in the network. But

unlike the locked-in network effects of web2, in web3, they are liberating for users. For example, successful user acquisition and retention can significantly improve the intrinsic incentives of web3 systems for developers and contributors, driving greater contributions of value by such parties to the systems, which ultimately attracts more users, and so on. Again, Ethereum's growth over the last two years is a prime example of this. Developer activity yielded products and services that attracted users, which attracted more developers and additional products and services, which led to further user growth. From the start of 2020 to the start of 2022, the amount of digital assets deposited in Ethereum's DeFi protocols grew from just over $600 million to just over $150 billion. In addition to the flywheel effects, the network effects of web3 systems can provide them with protection against competitors copying and redeploying their open-source infrastructure, because for systems with strong network effects, replication alone is unlikely to incentivize users to switch to the new system.[xix] This is further evidence that a web3 systems true value will be its network of stakeholders, not its tech stack.

Decentralized Governance

The vast majority of blockchain networks and smart contract-based protocols utilize decentralized governance. Decentralized governance has many benefits along each of the three decentralization criteria discussed herein, including that it:

- can make web3 systems more secure by distributing technical control over such systems to decentralized groups, thereby limiting the ability of any single party to take control of such system's governance.
- provides stakeholders with meaningful representation in the decisions of web3 systems, decentralized governance helps to ensure long-term incentive alignment among stakeholders. This feature, along with the enhanced security, means that effective decentralized governance can contribute to the overall health and sustainability of the decentralized economies of web3 systems.
- supports legal decentralization by reducing stakeholder reliance on the managerial efforts of any individual or group, thereby reducing the risk of potential information asymmetries.

While blockchain networks utilize a number of different consensus mechanisms, smart contract-based protocols typically utilize decentralized autonomous organizations ("DAOs"), which are member-controlled organizations that operate (or should operate) absent a centralized authority. DAOs typically utilize token-based voting, with DAOs maintaining specified control rights with respect to the smart contracts making up the underlying protocol as well as any treasury of digital assets for the protocol. The governance smart contracts that form and govern the DAO disintermediate transactions between counterparties by automating the decision-making and administrative processes typically performed by traditional management structures.[xx]

Designing decentralized governance for any web3 system requires a detailed analysis of the facts and circumstances of such system, but significant insights can be taken from the several different models that have been developed and implemented across the DeFi sector.

- ***SubDAOs*** – To streamline decision making, several DAOs empower subDAOs with tailored authority regarding certain categories of actions, such as legal, finance, development, etc.[xxi]

- ***Governance Minimization*** – To increase the dependability of DeFi protocols and overcome challenges with DAO participation rates, some have called to minimize the ultimate number of decisions that DAOs are required to make or to alternatively create a hierarchical structure in which more significant decisions require higher voting quorums.[xxii]

- ***Incentivize Participation*** – To ensure effective DAO governance, some DAOs incentivize active participation, including by compensating delegates. [xxiii]

- ***Progressive Decentralization*** – To protect against malicious attacks, many DAOs utilize progressive decentralization, where greater control is handed from the developer company to the community as the safety of the protocol/network increases.[xxiv]

In designing any decentralized governance system, careful attention should be paid to SEC releases regarding the same. The foundational text in this regard is the enforcement action brought by the SEC in 2017 against a DAO that was formed for purposes of pooling investor funds and allocating them to projects for purposes of investment (the "DAO Report").[xxv] In the DAO Report, the SEC provided a detailed analysis as to why investors in the DAO were reliant on the managerial efforts of others (*i.e.*, why the fourth prong of the *Howey* test was satisfied) despite the DAO having a decentralized system of governance in place. In particular, the SEC determined this to be the case because the efforts of the founding team and certain investment curators (who were selected by the team) were essential to the success of the DAO[xxvi] and because DAO token holders' voting rights were limited.[xxvii]

Following the DAO Report, the SEC provided a number of factors that it would consider in connection with a *Howey* test analysis that are relevant for DAOs and decentralized governance, including whether an active participant:

- plays a lead or central role in deciding governance issues;

- determines whether or how to compensate persons providing services to the network or to the entity or entities charged with oversight of the network;

- makes or contributes to managerial level business decisions, such as how to deploy funds raised from sales of the digital asset; and

- makes other managerial judgements or decisions that will directly or indirectly impact the success of the network of the value of the digital asset generally.[xxviii]

As a result, web3 systems should be careful not to vest too much power in the hands of insiders. Instead, significant control should be given to the community and where there are imbalances in power, web3 systems should look to delegate programs to help diffuse it. In striking this balance, web3 systems should also look to instill safeguards against malicious attacks, including potential manipulation of decentralized governance for profit. While the use of multisigs (where control requires multiple multisig holders to authorize an action) and offchain governance mechanisms have been common safeguards used for this purpose, they have recently been subject to significant criticism, including that they potentially undermine decentralization.[xxix]

Models of Decentralization for Web3

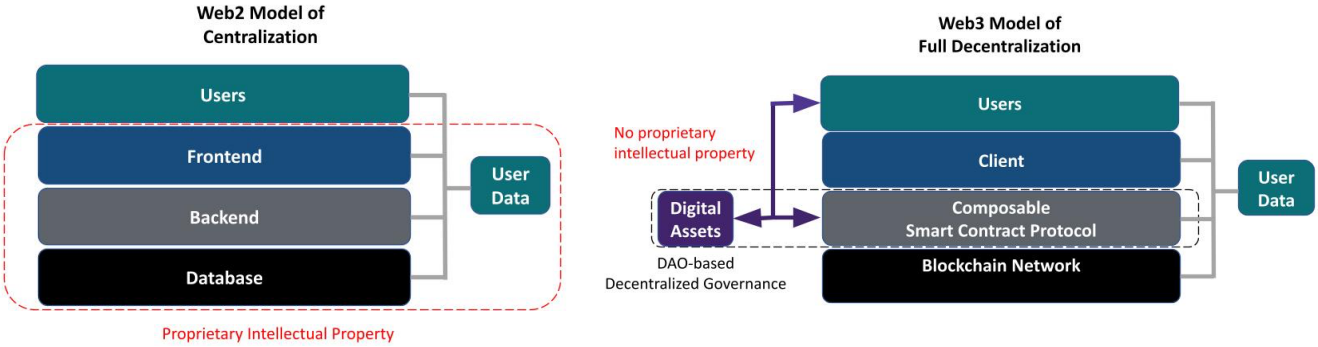
There are several different models of decentralization that we can construct for general application in web3, including "full" decentralization (where every component of a system is decentralized) and "open" decentralization (where independent third parties all participate in a shared decentralized system). Open decentralization can also be modified for specific applications, such as NFTs projects and for tokenization protocols. Finally, we can construct models of decentralization for new types of web3 organizations, such as collectives. Each of these models is discussed below to help builders along the pathway to true decentralization.

Full Decentralization

Web3 systems seeking to utilize a model of full decentralization will need every component of their system decentralized. This is the most commonly used model within the DeFi sector. We expect that the web3 systems most likely to use this model will similarly be novel smart contract protocols deployed to existing programmable blockchain networks.

As shown below, the shift from a web2 centralized model to a web3 decentralized model involves:

- deploying an open-source smart contract protocol to a decentralized and programmable blockchain network to form the core infrastructure layer of the web3 system – the smart contract protocol provides an execution layer for all of the components of the backend that can be deployed on-chain (i.e., payments, messaging, etc.);
- operating a "client" layer in a decentralized manner – the client represents all of the system's software that operates off-chain and acts as a gateway to the smart contract protocol (clients can range from being simple frontend websites to complex applications);
- adding digital asset distributions and incentivization mechanisms from the smart contract protocol -- this could be an airdrop to contributors and consumers; issuances to insiders (employees, advisors, and stockholders of the developer company); the allocation of digital assets to an explicit incentivization scheme (such as liquidity mining in DeFi); and the formation of a treasury controlled by the DAO and to be used in connection with any future incentivization;
- launching DAO governance of the smart contract protocol and DAO treasury; and
- ensuring user data is owned and retained by the user (currently a significant contention in web2 systems).



This full decentralization model assumes that the web3 system is a novel smart contract protocol deployed to an existing programmable blockchain network. "Users" here denotes both consumers and *contributors.*

For web3 systems that use this model, the decentralization of the blockchain network and smart contract protocol is achieved primarily as a result *of* the technical decentralization of those layers, and by the launching of decentralized governance in the form of a DAO that takes control of the smart contract protocol from the developer company that created the system. The result of the deployment of the smart contract protocol to a public blockchain and launching of a DAO results in transparency as well as greater safety and security for the system, and it means that no individual or group controls the system.

The decentralization of the client layer then happens in a few different ways. Within DeFi, where most clients are just simple frontend websites that provide a gateway to the underlying smart contract protocol (*i.e.*, they allow users to interact with the protocol), most developer companies make their client/website open source and host it on a decentralized file system (such as IPFS). With the client/website open source, third parties that are independent from the developer company often end up hosting their own client/websites providing access to the same underlying protocol. In addition, independent third parties often build gateways to the protocol into their own aggregators and dashboards. This means that gateways to the protocol are always available, regardless of whether the developer company's client/website is maintained.

The above steps mostly eliminates the potential for significant information asymmetries (the impetus for much of the U.S. securities laws) because (1) information about the protocol and its operations are transparently available on a public blockchain ledger and (2) the managerial efforts of the developer company that launched the protocol are no longer critical to the success or failure of such protocol. Further, the blockchain and smart contract layers are operational and not controlled by any group or entity, the system has full redundancy and the system no longer reliant on the developer company. DeFi primitives are a great example of this because they require little to no ongoing development to continue providing users with utility. As a result, protocols implementing this decentralization model could be considered legally decentralized, even without a fully functioning decentralized economy.

Limitations of Full Decentralization

Although the full decentralization model has been successfully used in DeFi, its simplicity means that there are several limiting factors that could make it unsuitable for more complex web3 systems. For instance:

- ***Complex clients*** – Within DeFi, the decentralization of clients is somewhat straightforward given their relative simplicity; very little incentivization is necessary to get third parties to build independent gateways (mostly in the form of websites) to such protocols. However, as web3 products and services become increasingly complex with computationally expensive/resource-intensive client layers built on top of underlying smart contract protocols, the decentralization of the client becomes more complicated. For example, consider the difference in complexity of the clients/websites that provide access to the Uniswap and Compound protocols as compared to hypothetical web3 social media clients, which would likely have much of the same functionality as web2 applications like Twitter and Instagram. Such complexity could reduce the pool of third parties that are willing to build and/or host alternative clients, or integrate access to the protocol layer within their own systems without explicit incentivization.

- ***Significant improvements required*** – Similarly, systems that require significant improvements post-digital asset launch may find it difficult to make those improvements in a decentralized manner. For example, in DeFi, many protocols have struggled to successfully use explicit token incentives to drive ongoing meaningful development of their smart contract protocols.

- ***Ongoing operations*** – Developer companies that intend to undertake significant operations to enhance the value of their web3 system post-launch of their digital asset may undercut the decentralization of such system if additional contributions of value do not also come from independent third parties. Governance tokens alone do not typically confer any rights to future products and services that a developer company may produce, and developer companies should clearly state stakeholders should not expect any such relationship to form or be maintained. The impression that any such relationship exists undermines the decentralization of the given system by increasing the risk that stakeholders are relying on the management efforts of the developer company. To reinforce the perspective that the developer company is not exclusively engaged to the original web3 system it deployed, such developer companies could consider the building of additional products and services that accrue value beyond the initial web3 system, with potentially ancillary or supplemental benefits to the existing web3 system.

- ***Retention of Exclusive Rights*** – If the original developer company or others retain exclusive rights to any intellectual property utilized in the system, it may undercut the system's full decentralization. For instance, if developers of complex clients for web3 social media wanted to keep such clients proprietary, the full decentralization model could be unachievable.

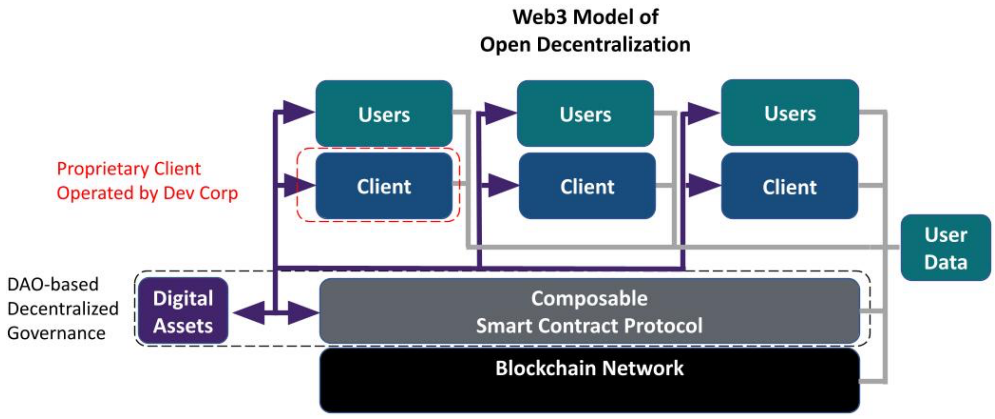
Each of these limitations can be overcome by web3 systems that are able to stimulate significant economic decentralization in the creation of functioning decentralized economies. If a decentralized group of developers, contributors, and consumers contribute and receive significant value, thereby diluting the importance of the original developer to the overall system, it moves the system from a full decentralization model to a more "open" decentralization model.

Open Decentralization

As with the full decentralization model above, the open decentralization model includes a decentralized blockchain and smart contract protocol layer, digital assets and a DAO.

But unlike the full decentralization model, an open decentralization model would also have independent developers building and operating several clients (which may be centralized) on top of a shared smart contract protocol layer. For instance, think of potentially rich and complex clients for web3 social media that have functionality similar to web2 applications like Twitter and Instagram, but that all utilize a shared smart contract protocol rather than proprietary backend systems.

The image below reflects an example of open decentralization of a web3 system.



This model also assumes that the web3 system is a novel smart contract protocol deployed to an existing programmable blockchain network. "Users" denotes both consumers and contributors.

In the web3 system pictured above, independent developers build and operate many clients on top of the same underlying smart contract protocol, all of which would utilize the digital assets of such smart contract protocol. In this model, the creation of such clients would be incentivized in several ways:

- ***Initial Incentives*** **–** Initial development could be incentivized through a combination of explicit and implicit incentives, including awards of digital assets from the DAO-controlled treasury of the smart contract protocol, the network effects of the protocol and the fact that such developers could retain intellectual property rights with respect to their respective clients.

- ***Ongoing Incentives*** – The ongoing maintenance and continued development of such clients could be similarly incentivized, with digital asset-based incentives being awarded automatically based on performance metrics established by the DAO. One example of this in DeFi is Liquity Protocol, which rewards the hosts of independent frontend websites that provide access to the protocol with awards tied to the economic activity driven by such frontend website to the protocol.[xxx] In more complex web3 systems, we would expect to see the prevalence of such awards increase significantly. For example, in a decentralized social media ecosystem, a client's user engagement could be measured and rewarded via tokens. Finally, in addition to incentives from the protocol, the operators of clients would be incentivized by any financial returns they are able to generate through their own proprietary clients.

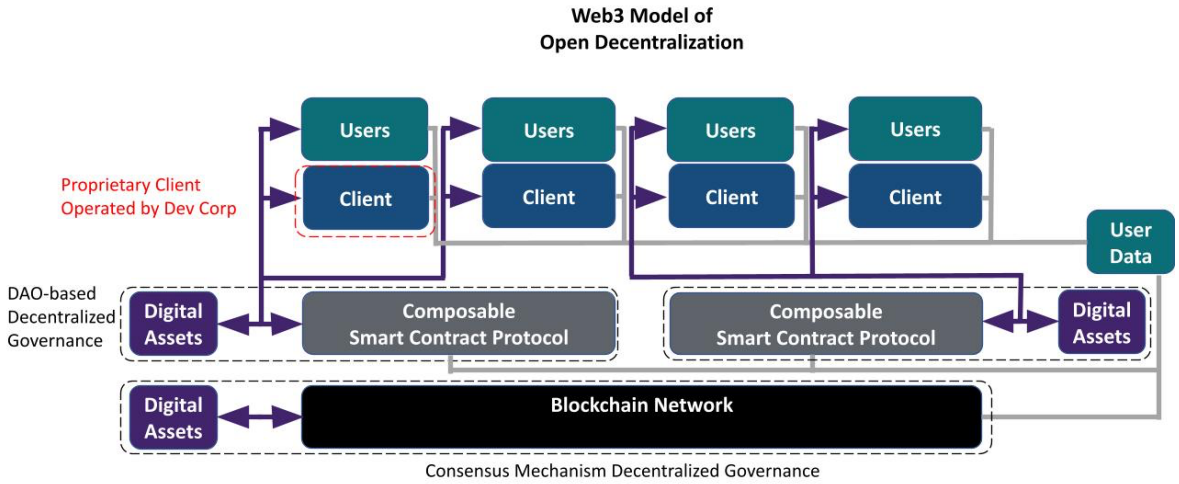
Web3 systems seeking to decentralize via the open decentralization model will need to design such incentive mechanisms and design their decentralized governance models to be "client agnostic" to encourage participation by many actors. In addition, they will need to ensure no significant imbalances of power accrue to a single client in a manner that would enable it to dominate the entire ecosystem. If such imbalances could easily occur, then the builders of these clients could view the web3 system unfavorably and be less willing to invest their time and resources in it. In some ways, such a system would have similar centralization and control problems as web2 systems.

These web3 systems should also prioritize transparency, open-source technology, data portability and composability to further reduce the risk of power over their systems becoming concentrated in the hands of developers. These features remove information asymmetry, lower the barrier to entry for competing developers and permit users to switch between clients, all of which fosters a more open and decentralized ecosystem, where users are not subjected to the constraints or burdens applied by any one client. This is a significant obstacle in current web2 systems, where user data is siloed in each captive web2 system.

In order to support a conclusion that the system is legally decentralized, this economic decentralization would need to minimize the impact of any failure of any individual client such that such failure would not substantially affect the success of the entire web3 system. At such point, no ongoing maintenance, development or management of a single client could be said to substantially affect the success or failure of the web3 system, which means that no party would be reliant on the managerial efforts of any individual or group within the system. Without any management efforts being provided, the risk of significant information asymmetries developing would be low. As a result, the system could be deemed to be legally decentralized.

While it may at first be counterintuitive to suggest that builders should prioritize the above design decisions because they effectively incentivize their own competition, doing so will help lead to the formation of a functional decentralized economy built on shared infrastructure, which will in turn lead to a far more expansive and richer ecosystem than any individual company would be capable of building alone.

For web3 systems wishing to utilize new purpose-built blockchains, the open decentralization model would appear very similar, with multiple smart contract protocols and related systems built on top of such blockchain.



This model reflects the decentralization model of many blockchain networks, with the addition of more sophisticated products and services provided through multiple clients operating on top of the system's smart contract protocols. Here, the web3 system would need to achieve decentralization at both the smart contract protocol level and the blockchain network level (instead of relying on the decentralization of an existing blockchain network), with the measure of the blockchain network's decentralization being based on an analysis of various factors, including the number of independent third parties providing computational resources that run the blockchain,

the number of developers building smart contract protocols and clients on top of the blockchain, the decentralized governance of the blockchain and the concentration of economics with respect to the blockchain. The decentralization of the smart contract protocol would be measured in the same manner described above.

Web3 Versions of Web2 Applications

To see how these principles play out in practice, below is an application of the open decentralization model to create simplified web3 versions of familiar web2 applications. The promise of web3 goes beyond merely disintermediating known features and applications, as it makes entirely new things possible, but the below focuses on just the low-hanging fruit for the purposes of illustration:

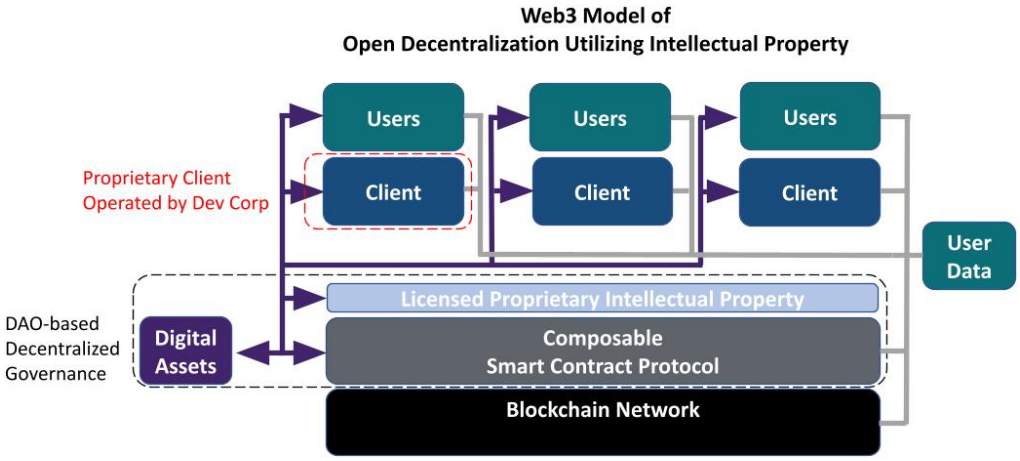
- Web3 gaming could entail a smart contract protocol that multiple games interact with and use for purposes of implementing in-game currencies, NFTs and a shared governance token. Players could earn such digital assets through in-game achievements, and contributors could earn such digital assets for creating mods or making other contributions, with all such digital assets being portable across the ecosystem and available for use in other ecosystems. The games driving the most use could earn the greatest percentage of the governance tokens distributed by the DAO, which could then be used to fund additional development by the creators of such game.
- Web3 social media could entail multiple iterations of social media services and messaging services each built as a separate client upon the same open-source smart contract protocol that shares a native governance token. Consumers would earn tokens based on use, contributors would earn tokens based on the content they create and the clients would earn tokens based on various metrics established by the DAO.
- Web3 marketplaces could utilize a collection of smart contracts and clients to coordinate service providers and facilitate their interactions and scheduling with customers. Developers could build white label versions of these clients, enabling providers to offer many different levels of customized services or products. Clients and the service providers would all earn the same governance token based on their contributions to the system.[xxxi]

Ultimately, the open infrastructure made up by the blockchain network and smart contract protocol in the open decentralization model provides a rich environment for a variety of specialized products and services to be built on top. By utilizing this shared infrastructure, builders can build web3 products and services at a fraction of the cost of building centralized web2 applications from scratch.

Open Decentralization Utilizing Third-Party Resources

One iteration of the open decentralization model worth further exploration is one in which a third party contributes a resource to the web3 system, with the intention that the clients of such system utilize it for purposes of their products and/or services. For instance, this could take the form of a license of intellectual property (a video game engine, a data asset or a marketplace) as well as an array of services, including regulatory compliance, marketing and business development.

The image below reflects an example of intellectual property being contributed to a web3 system.



From an economic decentralization perspective, the introduction of this proprietary intellectual property would appear to revert some of the system's decentralized economy to a developer/owner-controlled web2 economy, in that the operators of the clients may be unwilling to submit their products/services to the whims and control of the owner of the proprietary intellectual property. However, such risk could likely be mitigated through contractual terms of the license of such intellectual property to the web3 system (*i.e.*, irrevocable/perpetual duration, rights to modify/improve, etc.). An important consideration in this regard would be whether and what services and ongoing maintenance of such intellectual property would be required, and whether such services and maintenance could be provided by independent third parties, with greater reliance on the third-party owner of the intellectual property generally undercutting the system's overall decentralization. Ultimately, if the terms were structured correctly, the decentralized economy of the web3 system would remain intact. As an example, a web3 system's utilization of a widely available API in its clients should not undercut the overall decentralization of the web3 system. In fact, one could argue it enhances it.

From a legal decentralization perspective, the key questions would be: (i) are the essential managerial efforts of the provider of the intellectual property necessary to drive the success or failure of the web3 system; and (ii) would there be the potential for significant information asymmetries to arise. The answers depend on many of the same considerations discussed above. For instance, even if such intellectual property was critical to the success of the system, if the owner of the intellectual property could not revoke it at any time, the answer to both could be no, supporting the legal decentralization of the system. This would also be the case if the owners of the intellectual property had to seek approval from the DAO prior to making any critical changes to such intellectual property.

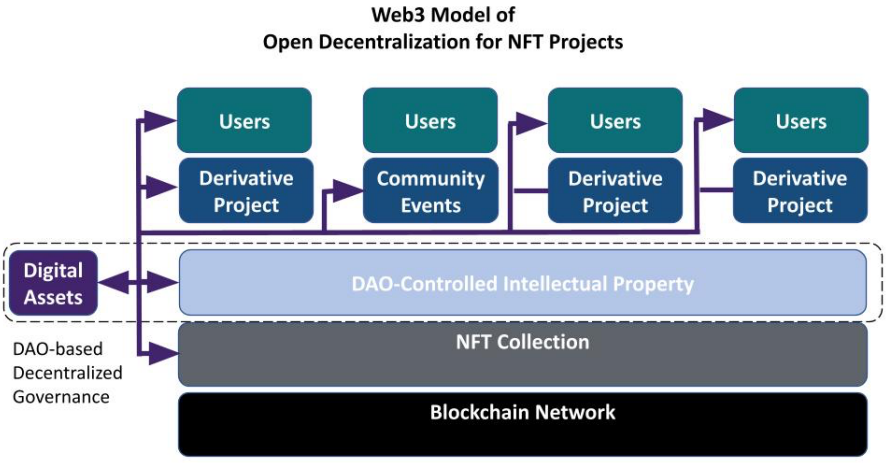
This concept can be extended beyond intellectual property to other resources that might be contributed or licensed to a web3 system. For instance, if a third-party regulatory compliance service enabled DeFi protocols to confirm their users were verified U.S. persons, such service should not undermine the decentralization of the web3 system. Similarly, one could imagine third parties providing marketing and business development related services to the protocol

independent of the activities of the individual client businesses. As above, while there are many ways in which the introduction of third-party resources could harm the decentralization of the system, such risks can generally be mitigated through structural and contractual mechanisms.

Decentralization of NFT Projects

NFT projects and their communities are an emerging type of web3 system and they offer a good opportunity to discuss certain concepts not previously discussed herein. To start, it is important to understand that the legal basis on which most artistic NFTs can generally be excluded from U.S. securities law is that they fail the fourth prong of the *Howey* test: The value of an NFT is largely intrinsic and not derived from the managerial efforts of others. However, as NFT projects are growing in complexity (new aspects include: additional content creation/NFT drops, implementation of NFTs in video games, community driven product development, etc.), the *Howey* analysis is becoming less straightforward because such elements may increase the reliance of NFT holders on the managerial efforts of others. As a result, it may be necessary for NFT projects to consider incorporating the principles of decentralization into their web3 systems, particularly if they intend to couple their project with a fungible token.

The below model above reflects: (1) an NFT collection minted on a blockchain and held by various users; (2) intellectual property contributed to the NFT community, most likely relating to the NFTs themselves (which could be "staked" to the community by the holders) and any lore created by the community; (3) digital assets distributions and incentivization mechanisms; (4) the launching of DAO governance with respect to the community intellectual property and DAO treasury; (5) the initiation of derivative projects; and (6) the hosting of social gatherings and events.



In this model, economic decentralization could be achieved through several steps:

- First, the DAO could use its initial resources on community engagement (*e.g.*, Twitter, Discord, etc.) and to fund social gatherings and other events, thereby boosting the implicit incentives of the community (*i.e.*, its popularity).
- Second, those implicit incentives along with explicit incentives (*e.g.*, fungible token awards, access to NFT sales, etc.) could then be used to incentivize the creation of derivative projects utilizing the community's intellectual property, with the developers

receiving rewards for developing such projects and consumers receiving awards for using such projects. For example, the DAO could employ a third-party developer to create a play-to-earn game using the community's characters, with in-game tokenomics featuring the native digital asset of the community. In this regard, the derivative projects act similarly to the clients described in the open decentralization model, making the overall system less dependent on any single source to drive value to NFT holders, which helps limit the risk of significant information asymmetries arising.

- Finally, one significant tool that NFT communities have at their disposal to fuel their decentralized economy are royalties on secondary sales of NFTs accruing to the DAO. These royalties would provide the DAO with a decentralized revenue stream during periods in which derivative projects may not be producing sufficient returns for the system.

Eventually, the combined incentives of the community could be substantial enough to cause derivative projects (whether funded by the DAO or third parties who pay the DAO for use of its intellectual property) to drive economic value back to the DAO. As with the prior open decentralization models, the accretion of value back to the DAO from a number of projects would reduce the importance of any single project, thereby enhancing the community's decentralized economy.

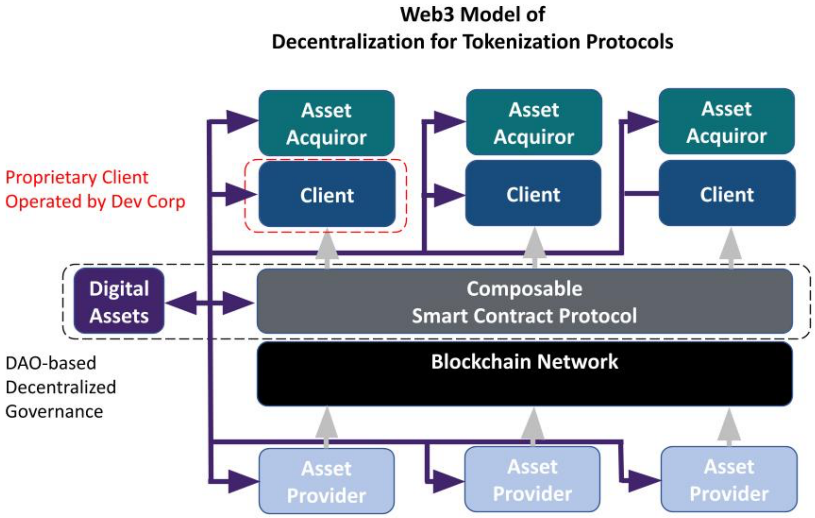
From a legal decentralization perspective, the key questions would again be: (i) are the essential managerial efforts of any third party necessary to drive the success or failure of the web3 system; and (ii) would there be the potential for significant information asymmetries to arise. The answer to both questions would depend on many of the same considerations discussed above, but the intellectual property in this scenario likely contributes to the community's overall decentralization rather than potentially hindering it, as it is contributed to the DAO from a decentralized source, the NFT holders. Further, with the DAO controlling distributions of tokens, additional minting of NFTs, and the DAO's intellectual property, and with revenue streams (either from royalties or derivative projects) being decentralized, the system would be unlikely to develop significant informational asymmetries.

As most NFT projects are still in nascent stages, we have yet to see several instances of NFT projects deploying decentralized tokenomics, but we expect to see significant variety in the structures utilized. As discussed above, many learnings can be incorporated from other web3 systems, including blockchain networks and DeFi protocols, and NFT projects are an exciting window into the potential of web3.

Decentralization of Tokenization Protocols

Tokenization protocols are another type of emerging web3 system. In these systems, assets are onboarded to a blockchain, tokenized by a smart contract protocol and then sold or used for other purposes. These include serial NFT minting projects, digital asset marketplaces and real-world asset tokenization projects.

The model below reflects: (1) assets brought on-chain from multiple providers through a shared smart contract protocol; (2) the smart contract protocol tokenizing such assets; (3) the sale or use of such tokenized assets through multiple clients; (4) native digital asset distributions and incentivization mechanisms; and (5) the launching of DAO governance with respect to the community intellectual property and DAO treasury.



In this model, economic decentralization could be achieved given sufficient diversity of inputs (asset providers) and outputs (asset acquirors), and the decentralization of the layers through which the tokenized assets flow (*i.e.*, the blockchain, the smart contracts and the clients). The DAO could use explicit incentives (fungible token awards, no commissions/fees) to incentivize asset providers to provide assets to the system, to incentivize clients to make a market in the tokenized assets and acquirors to acquire such assets or consume them. While the initial developer company may initially play a significant part in any of these roles (asset provider, client operator, asset acquiror), once the system is decentralized, the developer would eventually be just one of many actors in any given role. This would limit the risk of any significant information asymmetries accruing to it and reduce the reliance on its managerial efforts. In addition, many roles could be undertaken by the DAO and/or subDAOs.

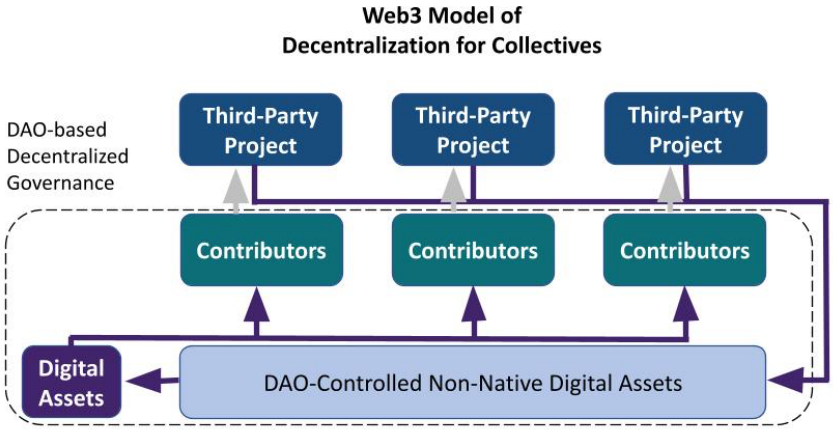
In addition, over time the explicit incentives could be adjusted to account for potential shortfalls on either the supply side or the demand side. For example, in a decentralized marketplace, token incentives to sellers could be increased to bring more goods for sale on to the platform, and token incentives to buyers could be increased to encourage more purchases.

From a legal decentralization perspective, the key questions would again be: (i) are the essential managerial efforts of any third party necessary to drive the success or failure of the web3 system; and (ii) would there be the potential for significant information asymmetries to arise. The answer to both questions would depend on whether the DAO could effectively manage its incentives to balance supply and demand and prevent any single asset provider, asset acquiror or client from becoming so important that the entire system's success relies on any one entity's efforts.

Collective Decentralization

The unique trustless organizational structures that DAOs enable will likely result in a significant increase in the popularity of collectives in web3, with groups of people acting together to provide services to web3 systems, manage assets or create and sell works of art. If these collectives wish to utilize their own native digital asset, care should be taken to ensure that they adhere to the principles of decentralization.

This model below reflects: (1) DAO-directed efforts of contributors being provided to third-party projects; (2) such third-party projects compensating the DAO in the native assets of such projects; and (3) such consideration being used to support the value of the DAO's native asset, with the combination of the two being used to compensate the DAO's contributors.



In order to maintain the legal decentralization of such systems, careful consideration must be given to the design of the governance mechanisms of such system in order to avoid contributors being dependent on the managerial efforts of any individual or leadership group of the system.

Additional Design Considerations for Decentralization Models

Progressive Decentralization

One challenge resulting from the interplay of economic decentralization and legal decentralization is that it often results in a chicken-or-the-egg paradox: true economic decentralization may necessitate the use of digital assets (*i.e.*, legal decentralization), but the use of digital assets necessitates economic and, consequently, legal decentralization. The existence of this paradox is one of the primary reasons why a regulatory safe harbor under U.S. securities laws would be valuable, even if it only applied during a short window during the beginning of a web3 systems life cycle. Absent the existence of a safe harbor, many web3 systems make good faith efforts to progressively decentralize.[xxxii] While there are many ways to approach such process from a technical and practical perspective, web3 systems typically take several precautions with respect to their digital assets during such period, including, among other things, limiting transferability and limiting issuances and listings in the United States. This approach becomes even more important for systems that are utilizing open decentralization, which requires fully functioning decentralized economies (as compared to DeFi protocols using models of full decentralization, which don't necessarily require economic decentralization).

The Return of Utility Tokens and Social Tokens

While we have focused on the interplay of economic and legal decentralization, and the resulting implications for uses of digital assets, it should be noted that there exists another available argument for why the digital assets of a web3 system may not be securities under U.S. securities laws. In particular, if the person acquiring digital assets in a given transaction could not have had a reasonable expectation of profits at the time of acquiring such assets, then the third prong of the *Howey* test would not be met and such digital assets would not be deemed to be securities. This line of reasoning was the predominant argument utilized by issuers during the ICOs of 2017 and 2018, and is one that the SEC spent considerable time challenging. However, at that time, the functional utility of many of the digital assets businesses were selling was non-existent. That is not the case today. The industry has made substantial progress since 2018 and today, tokens with true useable value are very much real. In-game currencies in video games are just one example. Other tokens provide holders with access to gated content or in-person events, giving them real social utility. We expect to see protocol designers continue to advance this trend in 2022 and implement utility into the decentralized systems discussed herein.[xxxiii]

Explicit Token Incentives

As we are still in an early stage of the development of web3, the network effects of very few blockchain networks and protocols are currently insurmountable. As a result, it has been particularly difficult for protocols to rely on implicit incentives to facilitate resilient decentralized economies for their system, which has in turn driven them to prioritize experimentation with explicit incentives for both contributors (*i.e.*, liquidity mining programs) and developers (*i.e.*, grant programs). Thus far, these programs have mostly failed to produce long-term and meaningful contributions by developers to web3 systems. As the industry matures, one would expect the network effects of particular web3 systems to increase, which should result in the draw from their implicit incentives increasing, thereby increasing the effectiveness of their explicit incentives.

Retroactive awards programs are an exciting opportunity in this arena as they are much more conducive for decentralized systems than grants programs. In particular, grant programs have been difficult to manage as it is difficult for DAOs to make decisions about (i) what projects will deliver the best value to a system and (ii) which developers are the best positioned to work on such projects. By deferring the assessment and awarding of contributions until after value has been delivered, retroactive awards programs both reduce a DAO's determination burden and incentivize an open marketplace of ideas and participants, spurring competition. The development of such marketplaces will necessitate (1) incentivization on the backend in the form of large retroactive awards, (2) incentivization on the frontend from private investors and (3) network effects that make it more lucrative for contributors to develop on top of protocols rather than build competing products. While all of these pieces are not yet in place, with the increasing popularity of retroactive award programs, the growing propagation of small and nimble investment DAOs, and a consolidation of network effects, we may be getting close to seeing successes on this front.

Conclusion

While the debate over the nature of decentralization may continue to unfold, the debate over its promise is over. The ripples of web3 disruption across several sectors, including finance, art and music, is clear, and these benefits will only become more pervasive as the expansion of web3 continues to accelerate. The pursuit of skeuomorphic[xxxiv] use cases and the creation of decentralized versions of web2 systems are only the first step in this process.

Builders of web3 systems currently face numerous challenges in initiating, managing, and scaling decentralization. But the framing of decentralization as a single design challenge with three aspects (technical, economic, and legal) should provide a strong reference guide to help builders as they use the novel components of web3 systems to overcome these challenges, even as regulatory requirements may shift. Failure to account for all three of these elements will lead us to a web3 that falls short of the future that blockchain technology and cryptocurrencies make possible. No one wants a “web3“ that is built on new tech, but that is otherwise indistinguishable from web2. Instead, by building systems that carefully and deliberately design for decentralization, builders can create digital infrastructure, and give life to decentralized economies, which will form the foundation of the internet for decades to come. It’s time to build that internet, and that future

* * * * *

ENDNOTES

[i] In general, this interaction is primarily additive as developments in one open possibilities in others. Some examples of limitations would be technological functions that do not confine themselves to existing law (*i.e.*, legal decentralization limiting technical decentralization) or high costs associated with utilization of the blockchain limiting the economic benefits (*i.e.*, technical decentralization limiting economic decentralization).

[ii] For more on decentralized web3 economies, see:

- Chris Dixon, Why Decentralization Matters, One Zero (Feb. 2018), https://onezero.medium.com/why-decentralization-matters-5e3f79f7638e
- Chris Dixon, Why Web3 Matters, Future (Oct. 2021), https://future.a16z.com/why-web3-matters/

[iii] It should be further noted that the coordination of distributed groups that blockchain technology makes possible also significantly reduces the inherent inefficiency of decentralized systems. We are still in the infancy of experimentation with decentralized governance and the rapid increase in the efficiency of decentralized systems suggests the possibility of not only meeting but exceeding the efficiency levels of centralized systems. A simple counter to the oft repeated refrain of criticizing the efficiency of decentralization compared to centralization is that after hundreds of years developing the mechanizations of centralized governance, the stagnation of progress might suggest taking a step back and developing an alternative.

[iv] *See*:

- https://defillama.com/chain/Ethereum
- Peter Allen Clark, Report: NFT sales exceeded $17B in 2021, Axios (March 2022), https://www.axios.com/nft-sales-17b-2021-report-de0c573c-7165-4a03-9266-dc441e34d28b.html

[v] *See*: Packy McCormick, Existential Optimism, Not Boring (Sep 2021), https://www.notboring.co/p/existential-optimism

[vi] For example, the Securities Act contemplates that the offer or sale of securities to the public must be accompanied by full and fair disclosure. This disclosure is typically provided through registration with the SEC and delivery of a statutory prospectus containing information necessary to enable investors to make an informed investment decision.

[vii] Specifically, the test established by the Supreme Court states that: "For purposes of the Securities Act, an investment contract (undefined by the Act) means a contract, transaction, or scheme whereby a person invests his money in a common enterprise and is led to expect profits solely from the efforts of the promoter or a third party, it being immaterial whether the shares in the enterprise are evidenced by formal certificates or by nominal interests in the physical assets employed in the enterprise." SEC v. W.J. Howey Co., 328 U.S. 293, 298-99 (1946).

[viii] SEC, Framework for "Investment Contract" Analysis of Digital Assets (2019), https://www.sec.gov/corpfin/ framework-investment-contract-analysis-digital-assets#_edn1

[ix] There continues to be significant uncertainty as to what constitutes "sufficient" legal decentralization for purposes of determining whether U.S. securities laws apply to transactions of a particular digital asset. In addition, even for web3 systems where there are no information asymmetries or managerial efforts on which investors rely, or where there are not even any public issuances or sales by a token issuer, the SEC could nevertheless seek to initiate actions against the developers and organizers of such systems for acting as sponsors or promoters of such systems. The way in which digital assets are issued and/or sold or otherwise made available and promoted could trigger the application of securities law, regardless of whether or not a system is decentralized. As a result, significant care should be taken when designing web3 systems that make use of digital assets, and particularly in connection with any issuance or sale of such digital assets. For more information on decentralization and the application of securities laws to digital assets, *see*:

- SEC, Digital Asset Transactions: When Howey Met Gary (Plastic) (2018), https://www.sec.gov/news/speech/speech-hinman-061418

- Stephen P. Wink, Witold Balaban, John J. Sikora, Jr. and Miles P. Jennings, Digital Asset Regulation: *Howey* Evolves, (Jan 2020), https://www.lw.com/thoughtLeadership/review-of-securities-commodities-regulation-digital-asset-regulation-howey-evolves
- Josh Garcia, Jenny Leung, Data Points to Measure Blockchain Network Centralization, Ketsal Open Standards (Oct 2020), https://ketsal.com/wp-content/uploads/2020/10/Ketsal-Open-Standards-Measures-of-Blockchain-Network-Centralization-October-19-2020.pdf
- Peter Van Valkenburgh, Framework for Securities Regulation of Cryptocurrency v2.0, Coin Center Report, 3 (Aug. 2018), https://coincenter.org/files/securities-cryptocurrencyframework-v2.1.pdf.

[x] While it is true that sophisticated parties could make use of advanced analytics platforms to glean insights that are not readily available to the public, this does not warrant regulation of digital assets as securities. In fact, securities laws do not actually prohibit or prevent this type of market inefficiency - the same paradigm exists in all public securities and commodities markets, where the private insights of sophisticated parties are eventually priced into the public price of the securities and commodities listed in such markets.

[xi] For more on the architecture of web3 systems, see: Preethi Kasireddy, The Architecture of a Web 3.0 Application, Blockchain (Sep 2021), https://www.preethikasireddy.com/post/the-architecture-of-a-web-3-0-application

[xii] For more on the potential use cases for wallets in this new paradigm, *see*: https://twitter.com/AlwaysBCoding/status/995753516001001472?s=20

For more on data portability, *see*: https://twitter.com/cdixon/status/1479920741768261633?s=11

[xiii] For more on interoperability, *see*: https://twitter.com/cdixon/status/1486010648140075015

[xiv] For more on composability, *see*:

- Linda Xie, How Composability Unlocks Crypto and Everything Else, Future (June 2021), https://future.a16z.com/how-composability-unlocks-crypto-and-everything-else/
- https://twitter.com/VirtualElena/status/1483861088588472326?s=20

[xv] *See*, 2019 Framework, https://www.sec.gov/corpfin/ framework-investment-contract-analysis-digital-assets#_edn1

[xvi] For more on the network effects of web3 systems, see:

- Hasu, Why I have Changed My Mind On Tokens, Deribit Insights (Dec. 2020), https://insights.deribit.com/market-research/why-i-have-changed-my-mind-on-tokens/
- https://twitter.com/cdixon/status/1485303906154467330

[xvii] See: Scott Moore, Seeking a New Kind of Public Good: Open Call for Proposals, Gitcoin (July 2021), https://gitcoin.co/blog/seeking-a-new-kind-of-public-good/

[xviii] See: https://docs.element.fi/governance-council/council-protocol-smart-contracts/optimistic-rewards

[xix] DeFi is home to an incredible web3 example of the interplay of network effects and competition. In 2020, a "vampire attack" of Uniswap occurred when its protocol was forked and its users were incentivized to transfer their liquidity to the Sushiswap protocol in exchange for Sushiswap tokens. The response to the attack by Uniswap included an airdrop of Uniswap tokens and a liquidity mining program, which led to a significant amount of liquidity being retained by Uniswap. While instances of such attacks have decreased in nature, forking remains a real threat to the success of networks and protocols and there continue to be numerous examples of developers deploying replica DeFi protocols to each new blockchain network that becomes popular.

[xx] *See*: David Kerr, Miles Jennings, A Legal Framework for Decentralized Autonomous Organizations, a16z (Oct. 2021), https://a16z.com/wp-content/uploads/2021/10/DAO-Legal-Framework-Jennings-Kerr10.19.21-Final.pdf

[xxi] https://twitter.com/Cooopahtroopa/status/1465391570144927757?s=20

[xxii] While governance minimization works for certain DeFi protocols that do not require ongoing decision making, it is unlikely to be a framework that will work for more complex systems. Nevertheless, the issues

of dependability and participation rates it seeks to address must be considered.For more on governance minimization, see:

- Fred Ehrsam, Dan Robinson, Governance Minimization, Paradigm (Nov 2020), https://fehrsam.xyz/blog/governance-minimization
- https://docs.reflexer.finance/ungovernance/governance-minimization-guide

[xxiii] *See*: https://twitter.com/_PorterSmith/status/1505960487162425347

[xxiv] Jesse Walden, Progressive Decentralization: A Playbook for Building Crypto Applications, a16z, https://a16z.com/2020/01/09/progressive-decentralization-crypto-product-management/

[xxv] SEC, Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO (July 2017), https://www.sec.gov/news/speech/speech-hinman-061418, https://www.sec.gov/litigation/investreport/34-81207.pdf

[xxvi] Among the facts asserted by the SEC were that:

- The founders primed the market to rely on them through their active engagement with investors, through marketing materials and through the operation of online forums;
- The founders and curators were critical in monitoring the operation of the DAO, safeguarding investor funds and determining whether proposed investments would be put to a vote.
- Curators were to vet investments, determine whether and when to submit proposals for votes, determine the order and frequency of proposals that were submitted for a vote and determine whether to reduce the default quorum necessary for certain proposals. As a result, curators could impose their own subjective criteria on whether investments were put up for a vote.
- Curators had the power to determine whether a proposal to remove a Curator was put to a vote.

See, https://www.sec.gov/litigation/investreport/34-81207.pdf

[xxvii] In particular, the SEC concluded that "the voting rights afforded DAO Token holders did not provide them with meaningful control over the enterprise, because (1) DAO Token holders' ability to vote for contracts was a largely perfunctory one; and (2) DAO Token holders were widely dispersed and limited in their ability to communicate with one another." *See*, https://www.sec.gov/litigation/investreport/34-81207.pdf

[xxviii] https://www.sec.gov/files/dlt-framework.pdf

[xxix] Andrew Thurman, SEC Enforcement Against Wonderland Could Mean Trouble for DeFi, CoinDesk (Feb 2022), https://www.coindesk.com/policy/2022/02/14/sec-enforcement-against-wonderland-could-mean-trouble-for-defi/

[xxx] See: https://docs.liquity.org/.

[xxxi] Packy McCormick, Braintrust: Fighting Capitalism with Capitalism, Not Boring (Jan 2022), https://www.notboring.co/p/braintrust-fighting-capitalism-with

[xxxii] Jesse Walden, Progressive Decentralization: A Playbook for Building Crypto Applications, a16z, https://a16z.com/2020/01/09/progressive-decentralization-crypto-product-management/

[xxxiii] Regardless of their utility, issuers of utility tokens should consult with counsel as such tokens may still constitute investment contracts under the *Howey* test, particularly if such tokens are sold in a scheme that has the appearance of an investment opportunity.

[xxxiv] Interface objects that mimic their real-world counterparts in how they appear and/or how the user can interact with them.