Web 3.0: The Future Architecture of the Internet?

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Abstract: Pursuant to two broad "iterations" of the world wide web, the first relegating the user to a rudimentary read-only role, and the second to that of a content-creator bound by an architecture of oligopolistic entities, a third iteration (Web 3.0) is posited as one wherein the user is incarnated as the ultimate arbiter and primary agent of value creation and exchange. To attain such decentralized ownership for a new internet architecture, Web 3.0's proponents argue for a blockchain-oriented structuring of the internet, with the onus of participation and possession relegated to the user at the centre. The aim of this paper, then, is to gauge the merits of such a decentralized manifestation of the internet as Web 3.0 using social, economic, and cultural lenses.

[1] Original version of the paper uploaded on 30 september 2017

Web 3.0: The Future Architecture of the Internet?

Web 3.0[2], or simply Web3,[3] is a novel conception of the architecture that underpins the internet, and it follows from two broad "iterations" of the world wide web (Web 1.0 and 2.0). The term was coined by Gavin Wood (of Polkadot[4] and Ethereum fame), and has garnered considerable currency among certain futurists in the recent past. For the purposes of comparison, Web 1.0 was characterized by rudimentary read-only passivity in users, who would browse a generally clunky and poorly organized system of limited accessibility at low bandwidths. Web2, which is our current state, and which has dominated for a good 15 years now, is characterized by a more dualist interactivity among the producers and consumers of content. For example, people tweeting, blogging, liking, reviewing, and posting; all represent active forms of content creation over platforms. These activities create value in and of themselves, and users thus absorb content created by others as much as they go about creating content of their own.

The problem with Web2, according to critics (see discussions in Garon, 2022; Voshgmir, 2020), is that the platforms on which users interact are pillars of power in their own right. These platforms act as arbitrary gatekeepers and adjudicators among users, which gives them a staggering degree of power over the structure of the internet. For example, Facebook (or more precisely, Meta and its algorithms) will be active curators of content, as well as ushers of information to the public on it social media platforms[5]. The same is true for YouTube and Netflix in the streaming video category, Twitter in the microblogging sphere, Amazon in e-commerce, LinkedIn in the professional networking space, and Google

[2] A note on terminology: Web 3.0 and Web3 are used interchangeably in this paper
[3] The progeintor of the world wide web, Tim Berners-Lee, spoke of a "semantic web" which is not the focus of this paper since it is a component within the Web 3.0 as is discussed here.
[4] One critique worth mentioning at this early juncture is that Polkadot has used the term "Web 3.0" as part of extensive marketing, and so the diffusion of the term may be attributable to a strong vested interest that piques the attention of futurists without necessarily following though to fruition the architecture in question
[5] This includes facebook and instagram

(Alphabet) in the search engine space overall. These oligopolies are sometimes referred to as the “Big Six” or “Silicon Six” (Chohan, 2021a, p.104).

The “value” of these platforms is astronomical when gauged from the stock market, with their capitalizations approaching (or exceeding) $1 *trillion.* Yet their value in the social / public interest sense (or public value sense, see Chohan, 2021a) is more questionable. There are many “joys and ills” created by these platforms (see review in Chohan and DeSouza, 2020), ranging from the psychological, to the sociological, to the political (Aldwairi and Alwahedi, 2018; Naeem et al., 2021; Apuke and Omar, 2021). Platforms have come into increasing disrepute for a variety of reasons, and their integrity and public value proposition is increasingly questioned (Chohan and DeSouza, 2020; Chohan, 2021a). Congressional testimonies, parliamentary enquiries, academia, and even public discourse have highlighted a greater antagonism towards the oligopolistic power exercised by these platforms. Over the past three decades, these oligopolies have grown from lean, agile, small-sized outfits into juggernauts that completely dominate their sub-areas (search engine, microblogging, etc.), and have simply acquired any company that posed even the remotest challenge.

By simply buying up any competition, they have erased even the semblance of the accessibility that would foster an innovative market. For this reason, the internet of 2022 looks remarkably similar to that of 2012, even though the internet of 2009 was remarkably different from that of 1999. This sense of built-in inertia suits the needs of oligopolists seeking super-normal profits, but does not necessarily serve the needs of consumers as individuals or as a collective. There are other approaches, even within Web 2.0, which allow for user adjudication to a greater degree. Reddit and its vast subcommunities (subreddits), or Wikipedia and its countless Wikis, leave the onus on consumers to run the architecture of the community. Such communities contribute significant value in their own right, and also serve as an indicator of what might be possible given the current architecture.

But the question at hand is to imagine an even better architecture, and not remain mired in the current system by conferring a sense of permanence to it; particularly since many people can and do remember a time before the internet existed at all. A new architecture where the digital empowerment of the individual reigns supreme, where she breaks the virtual shackles of juggernauts relentlessly competing for her eyeballs’ attention, and where she can engage with others as a mediator, consumer, and producer of value - this is the goal of those who envisage a Web 3.0. In others words, a third iteration of the web is posited

wherein the user is incarnated as the ultimate arbiter and primary agent of value creation and exchange.

The aim of this paper, then, is to gauge the merits of such a decentralized manifestation of the internet as Web 3.0. To attain such decentralized ownership for a new internet architecture, Web 3.0's proponents propose a blockchain-oriented structuring of the internet, with the onus of participation and possession relegated to the user at the centre. It is premised on the construction of a "user-centric" architecture (Voshgmir, 2020), and has three salient features: "individual blockchains, federated or centralized platforms capable of publishing verifiable states, and an interoperability platform to hyperconnect those state publishers" (Liu et al., 2021). It therefore draws upon a rich area of technological breakthroughs (blockchains), to ponder whether an entirely new cyberspace can be built on similarly decentralized, self-reinforcing foundations.

This proposition is logical in the sense that many offshoots of blockchains have emerged in recent years, far beyond the limited realm of cryptocurrencies, that have popularized such things in the public's imagination. Cryptocurrencies are a very specific, and by no means the sole (or even the most important), example of blockchain technology. They simply happen to be the most lucrative, and therefore the most speculative, iteration of blockchains. However, a vast panoply of uses have been conceived and are still yet to be conceived (Chohan, 2022b), which are entirely unrelated to cryptocurrencies. They cross into a vast domain of virtual engagement that is beyond the scope of this paper (but see partial reviews in Jiang et al., 2018; Kadam, 2018; Chohan, 2022b).

Web 3.0 is but a natural extension of that exploration outwards, albeit a particularly bold one, since it foresees blockchain as constituting the processual paradigm of an internet architecture. It may even entail one that is more scalable and secure (Zarrin et al., 2021). Blockchain would be, as with cryptocurrencies, a useful method of approach insofar as the object of delinking the internet experience from the Silicon Six's oligopolies is concerned. As Garon notes, "at the heart of the Web3 movement is a philosophical goal of decentralized and democratized control of the internet instead of control vesting in an oligarchic set of interdependent multinational corporations or traditional superpowers" (2022). To strong proponents, Web 3.0 will "democratize everything, reshaping art, commerce and technology; displacing intermediaries; and putting people more directly in control of their destinies" (Livni, 2021). Democracy is therefore a central tenet of the pro-Web3

argumentation, but democracy in an anarchist (or better said: cryptoanarchist) sense (see Chohan, 2017).

There is thus a strong counter-hegemonic element (Chohan, 2021d) to the anarchist aspirations of Web 3.0's proponents, which echoes the appeal of cryptocurrencies to their most die-hard proponents. However, cryptocurrencies themselves have been the subject of much disapproval due to their inequalities, which mirror those of traditional currencies in terms of the ownership of wealth (Chohan, 2022a). This is a point covered in a later section of this paper, but it speaks to the concern that, whatever shape(s) Web 3.0 is actually intended to take, one must view the rhetoric with a degree of caution, given that the actual efflorescence of Web3 may not cohere completely (or even nearly) with what the proponents might wish - a point that is particularly à propos when recognizing the plurality of path-dependencies that might emerge in decentralized systems (see path-dependency in Chohan, 2022c).

With so many paths that might materialize regarding Web 3.0, it must be noted that there is a significant degree of skepticism regarding the notion of a Web 3.0 altogether. One counterargument is that it will not really be as decentralized as one might think, since as with cryptocurrencies (Chohan, 2022b), there are significant players at the wallet-end (the "Whales," see also Chohan, 2022a), and the exchange-end (Binance, Tether etc.) that can and will exert control. Another is that there is much more hype about the subject, not dissimilar to NFTs (see Chohan, 2021b), which leads to utopian (or simply marketizing) exaggerations.

With that in mind, Web 3.0 can be conceived through many different prisms, including the **social,** the **economic,** and **cultural.** The first refers to the interactions among users as part of a virtual society (Stanescu, 2016; Keizer, 2021); the second sees Web3 as a domain of economic value creation (Voshgmir, 2020; Chohan, 2021a); and the third refers to the creative production of cultural artifacts and content (Potts and Rennie, 2019; Chohan, 2021b). Naturally, there are other ways in which to frame the scope of Web 3.0, including the political or legal (Garon, 2022), not to mention a significant computer scientific / technological literature that is likely to expand much further (see Zarrin et al., 2021). The scope of this paper, however, is relegated to the aforementioned three in bold, and that too in a somewhat cursory manner, given the early stage at which Web 3.0 is envisaged by a great many thinkers in diverse ways. The remainder of this paper considers some of the

possibilities of Web 3.0, at a very incipient stage of its conception, along the aforementioned three dimensions, followed by brief concluding remarks.

Social

What is the social element of engagement in cyberspace? Evidently there are many elements that fit into this category. One goes online to connect with people not in one's immediate proximity (Twenge, 2013), whether previously known or unknown (and perhaps both simultaneously). One seeks to express one's thoughts and emotions, and share them with others while gauging their reactions (Osatuyi, 2013; Chohan and DeSouza, 2020). One seeks to ascertain others' views, and keep track of their lives (real or imagined). One seeks to be part of something larger, in the sense of developing an imagined community with whose members one might share some form of affinity (Jurgens, 2012). One may seek to learn - in the widest sense of the term. One may simply wish to escape the mundane nature of a real, material existence that offers far too little stimulation. Naturally, these elements can and do have negatives, including "disconnection" through social engagement (Osatuyi, 2013; Twenge, 2013), the dissemination of fake news (Chohan, 2021a), the distortion of one's perceptions about others (as individuals or as a collective), among other maladjustments.

This leads to two fundamental questions in the context of the social experience of Web 3.0: (1) is it possible to engage on a platform in Web3 without requiring the architecture of Web2? and (2) would the same sorts of problems (or other worse ones perhaps) emerge in the social engagement of Web3? From what one might surmise thus far, for the first question, it seems evident that such a thing might be possible, as early prototypes of blockchain-based social networks / social media already exist, among whom one of the most prominent might be *Steemit* (Kim and Chung, 2019; Ba et al., 2021). Steemit seeks to reward content created by users based on the judgements of other users, in a blockchain-based and internally-robust token currency. It therefore represents something of a precursor to what might be possible on Web 3.0 with the content's ownership delegated more intimately to the user.

For the second question, it remains a matter of speculation whether such problems might exist or worsen, but there doesn't seem to be anything inherent in the novel structures of

Web 3.0 that would lessen the societal and psychological damage of virtual social engagement. In fact, it may make it more severe, since the regulation and prosecution of crimes regarding hate speech, violence, terrorism, child abuse, and other terrible and pernicious acts might be considerably more difficult due to decentralization. This is not a trifling consideration, and the gift of decentralized cryptoanarchism can easily morph into a curse (Chohan, 2017), as bad actors seize upon the promise of new technologies much more readily than the well-intentioned. Yet this problem must be addressed through further research, particularly as Web 3.0's more crystallized versions materialize. However, some elements seem to favor Web3's propositions, as when Stanescu argues that e-learning is better facilitated through Web3 because of a more direct connection between "user and the web environment" (2016).

Yet, as Keizer et al. caution, such technologies will require reputational systems to facilitate the interaction among decentralized users (2021). This prescient suggestion points to a larger issue within Web3's social ambit: it may blend the crises of social media (Chohan and DeSouza, 2020) with those of the blockchain (Chohan, 2019, 2021a, 2022a-b). This is because, instead of having resolved the negative tendencies of either technology, the nature of Web3 might compound both. For example, in the same way that cryptocurrencies purport a degree of "trustlessness" (Chohan, 2019a) but then are swamped by issues of trust (Chohan, 2021a, 2022b), Web3 may not cohere with a certain optimism that has emerged (Garon, 2022; Voshgmir, 2020) without first remonstrating the optimists with the challenges of navigating virtual life. The foregoing point about greater difficulties in regulating online crimes is worth considering again here.

Yet this is not an argument against Web 3.0 per se, since Web 2.0 continues to produce an ever larger litany of societal discontents, and one needn't wait for those to dissipate before proceeding towards a more pristine structure. Action must be taken to improve the social element of the web at every stage. It should also be noted that many proponents of Web 3.0 presume that it will co-evolve with Web 2.0, in the sense that the architecture of Web2 would not be erased in any way, but rather exist simultaneously with Web3. Human behavior on social media (at the individual and collective levels) is the subject and object of a sustained multidisciplinary research endeavor (Chohan and DeSouza, 2020), and its remit may only be partially refined by a modified internet infrastructure, if at all.

Economic

A significant component within the imagination of Web 3.0 is the question of value creation and value exchange. Web 3.0's suggestive formulations posit the construction of "user-centric identities" which lie at the crux of value creation (Voshgmir, 2020). In addition, the incorporation of new technologies such as *non-fungible tokens* (NFTs, see Chohan, 2021b) and *decentralized finance* (DeFi, see Chohan, 2021c) are seen as either precursor, template, or supplement towards the construction of Web 3.0. The degree to which such technologies can substitute for the value-exchange systems currently used in Web2, including cryptocurrencies (to some degree), remains an open question.

Cryptocurrencies themselves have been the subject of much disapproval due to their inequalities, which mirror those of traditional currencies in terms of the ownership of wealth (Chohan, 2022a). Who is to say whether Web 3.0 does not, in practice, come to reflect similar inequalities? In other words, what is to prevent new modes of oligopolization over the new architecture? Certainly, juggernauts such as Google or Facebook would not exert their insatiable dominion over such a superstructure,[6] but the "cryptoanarchism" of Web 3.0 (see cryptoanarchism in Chohan, 2017) will still be vulnerable to new oligopolists, insofar as current cryptocurrency systems do have oligopolists: in two ways. First, there are the whales who own a disproportionate portion of the largest cryptocurrencies in their wallets (Chohan, 2022a), and so they wield the potential to exert excessive influence on the prices of cryptocurrencies should they choose to transact.

Second, there are large players who facilitate cryptocurrency interactions, such as cryptoexchanges,[7] NFT exchanges,[8] and stablecoin-managers.[9] Tether's influence on stablecoins, OpenSea's influence on NFTs, or Binance's influence on cryptocurrencies, all suggest that one should not be lulled into a false sense of cryptoanarchist economic freedom when considering even the extant architecture, let alone a novel one. In many countries, compliance with regulations involves stringent stipulations grounded in real,

[6] They may, however, continue to loom large in the parallel architecture of Web 2.0, which may continue to exist simultaneously with Web 3.0
[7] Large exchanges include Bitfinex and Binance
[8] A good example of a dominant NFT exchange is OpenSea
[9] The dominant stablecoin is Tether

material considerations. The same may be true of Web 3.0, given that regulatory structures differ around the world.

Furthermore, there may be, as with Web 2.0, various dominions separated by "Great Firewalls." Afterall, China's Web 2.0 internet is enclosed to a certain degree; then why wouldn't its Web 3.0 be so? Extending this argument further, would the Chinese version of Web 3.0 really need to be decentralized? One may draw the parallel with the response of China's regulatory authorities towards cryptocurrencies (as of this writing), which has been to ban them entirely, but offering a digital yuan as a counteroffer to citizens. Web3 might similarly adopt a centralized response, in the way that the digital yuan of the Great Firewall does, such that users may benefit from new architectures, which differ from those contemplated by other societies. This would be reasonable, insofar as value creation and exchange are concerned, since the digital economy can have many different versions in a new iteration of the internet. From this, one may posit that three may not be a single Web3, but multiple ones, in the same way that they are multiple Web2s.[10]

For other countries, the cautionary injunction might be that, if NFTs and DeFi are seen as important vehicles in Web 3.0, then there is some cause for concern because these categories of virtual economic instruments are riddled with problems similar to those of cryptocurrencies, but to a much greater extent (Chohan, 2019, 2021a-c, 2022a-b), above all pertaining to illegal, fraudulent, harmful, and nefarious actions. DeFi is very much a "wild west" in terms of its transactional atmosphere, and a Web 3.0 that is premised on similar assumptions of exchange will be severely damaging for economic life in a new architecture. In other words, such concerns will loom large over a massively decentralized internet architecture, since as mentioned in earlier sections, the regulation and prosecution of crimes (including economic ones) will be much more difficult (although not altogether impossible, as has been seen in the case of cryptocurrencies).

Cultural Production

For the purposes of distinction, the "cultural" element of Web 3.0 refers to the production and exchange of artifacts and cultural items, as opposed to the "social" which involves

[10] For example, Google does not dominate the Chinese search engine market (Baidu does). Nor does Whatsapp or Facebook Messenger dominate the messaging market (WeChat does). In addition, Amazon does not dominate the e-commerce space in China (Alibaba does).

interactivity and connectivity among individuals and groups. One might engage in cultural production without necessarily being social,[11] and one might be socially interactive without producing anything cultural. Creativity lies at the crux of this section, and one may observe from the past decade there has been considerable cultural production involved with blockchain technologies (O'Dwyer, 2020), and Web 3.0 might have much more to offer in that regard (see discussions in Ragnedda and DeStefanis, 2019), and not only in the production of new content, but in the preservation of cultural heritage as well (Ch'ng, 2019; .Trček, 2022).

For example, Potts and Rennie contend that a Web3 architecture would be propitious for the creative industries, by "enabling the automation of the value components, including payments, licensing and intellectual property management, contracting and governance, digital content storage and access," (2019). They argue that it would foster a new "'value-based economics' in which artists set the terms of their market participation," because it would allow participants in creative industries "to improve transparency along supply chains, to lower costs of distribution by creating more direct platforms to connect artists and fans, and to improve handling of intellectual property and licensing arrangements, metadata, royalties and payments" (Potts and Rennie, 2019). These are the sorts of important considerations embedded in the promise of Web 3.0: an efflorescence of creative energies premised on the value-based economics that allow for creators to dictate the means and terms of their engagement.

In that regard, non-fungible tokens (Chohan, 2021b) are one sort of artifact that has blossomed in recent times, but questions about its economic and cultural value abound. Web 3.0's scope will, however, likely extend far beyond token creation and towards cultures and subcultures that benefit more so from the "value-based economics" that Web3 might offer. Conceptions of Web3 should not, therefore, be clouded by the questions that NFTs alone raise. Decentralization has long been observed to offer a useful ingredient in creative cultural production (Gassman and Gaso, 2004), and so the value proposition of Web 3.0 might extend from that logic in empowering the creative user, further unburdened by the filtrations of Web 2.0, to excel in cultural output.

[11] Think of all the Spotify songs with no listens or likes.

Conclusion

Web 3.0 has its fair share of critics, for a variety of reasons covered across this paper.[12] Furthermore, the advent of a true Web 3.0 seems at once a distant aspiration and a proximate eventuality, depending on the audience and on the futurist orator. The work that is required to launch such a broad-based, decentralized web architecture is considerable, but this does not seem to dispel the buzz, particularly among futurists, cryptoanarchists, and blockchain enthusiasts who yearn for something beyond Web 2.0. Certainly, there are many discontents generated by the current architecture, not least in the oligopolistic control exercised by a few titans who extract enormous profits from the sale of user data and the targeted advertising to them, not to mention incessant intrusion into the private lives of users. An increasingly vocal contempt is being articulated by all segments of society, and even structures of power (such as legislatures) are beginning to agitate against the Silicon Six.

This makes many yearn for at least the possibility of an alternate structure, and that is where Web 3.0 resonates the strongest, even if its conceptualization requires much more thought. What is most frightening, however, is that many social and economic problems may worsen under Web 3.0, due to the decentralized nature of the architecture, vulnerable as this is to predation. What blockchain technologies have taught us thus far is that, for all its promise, there are many worrisome elements that seize upon it with zeal to advance nefarious agendas. No caution raised against such threats would be enough. However, what blockchain technologies have also taught us is that the possibilities that lie ahead are many. Web 3.0 may appear to be a very bold example of what blockchain possibilities might offer, but it may hardly be the boldest example yet, and the brightest innovations are likely yet to come.

[12] To recapitulate, the prominent critiques include: (1) the vested marketing interest of agents such as Polkadot, (2) the notion that Web3 would only exist in parallel to Web2; and (3) there are considerable risks in terms of criminal activity, and their prosecution would be considerably more challenging in a decentralized architecture.

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