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The web of value

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Abstract: The future iteration of the internet is often branded as Web3, claimed to be a decentralising phase of its evolution, a reaction to the centralisation in the Web 2.0 era. This upcoming version of the internet, afforded by distributed ledgers and blockchain technologies, is sometimes also called the "Web of Value". It highlights the expectation that as much of the content and services on the internet get "tokenised", which enables their trade and related operations of 'value creation'. It is claimed that as the value of everything on the internet becomes more salient, conditioning new kinds of economic activities, relationships and forms of organising. In this article we discuss these expectations as imaginaries, the implications of which vary based on how they are framed or interpreted by different economic theories. More specifically, the article discusses the interpretations deriving from neoclassical economics, classical economics, heterodox economics and public value theory. We demonstrate significant differences between these interpretations and how they are offering competing imaginaries on the future internet.

Definition

The *Web of Value* is a conceptualisation of the forthcoming internet era of public blockchains, in which much internet content and many services and products are expected to be ‘tokenised’, enabling their trade and facilitating the emergence of new decentralised organisational forms aimed at collective value creation through co-creation, trading, provision of new currencies or tokens and other financial operations.

Introduction

The Web of Value (or the ‘Internet of Value’) is a term that is often employed synonymously with ‘Web3’,¹ or the ‘Internet of blockchains’, and is mostly used in industry discourse. It refers to an internet where users can publish, distribute, and trade information, services, and products of ‘value’ without the interference of intermediaries (see Floros, 2019; Skinner, 2016; Tapscott & Tapscott, 2016; Upadhyay, 2019; Vadgama et al., 2022). Its second main denotation is the condition where many internet content items or relationships (for instance memberships to communities) have value perceivably attached to them. This means that they are turned into tokens and their price in other kinds of tokens is easily accessible. For instance, a digital book can exist in the form of a non-fungible token (NFT)² and all transactions with it in various cryptocurrencies, including details such as prices, are observable on a public blockchain. In this way, the relative value of all content units or services is understood as salient, calculable, transferable and tradable.

The implications of these denotations, however, depend on varying conceptualisations of ‘value’. We will discuss these conceptualisations below, comparing classical, neoclassical and heterodox approaches to value creation, as well as the implications of the concept of public value. The classical approach is understood to be constituted by the works of seminal authors before the 20th century – such as Adam Smith, David Ricardo and Karl Marx – that saw labour as central to value creation. The neoclassical approach that dominates current mainstream economics emerged in opposition to the classical approach, establishing the rational perception of utility by buyers as central to the definition of value. Heterodox approaches

1. Blockchain industries have coined the term Web3 to denote a new version of the internet that is expected to arrive after the era of Web 2.0. The latter is therein understood as dominated by platforms that typically provide services in exchange for users’ personal data. Web3 is understood to rely on decentralised apps that run on blockchains, and is expected to allow users to autonomously control their various digital assets, including their personal data.
2. An example of this could be a solution provided by Book.io.

such as evolutionary and institutionalist economics challenge the neoclassical approach by arguing that value creation processes and value perceptions are path dependent and rely on interactions between different institutions that may, however, have rather different rationales and understandings regarding what is of value.

We limit our analysis to these broad approaches (which all have their inherent differences) as they provide the most distinctive alternatives to interpreting the implications of the emergent new iteration of the internet. The analysis demonstrates how these value theories lead to different social imaginaries on the future of the internet. The conceptualisation of the 'social imaginary' builds on work by Robin Mansell (2012) who used it to describe the differences in the way societal actors understand and make sense of the dynamics of technological innovation. As such the concept of an imaginary constitutes a basis for a critical analysis of their interests and actions in information society evolution.

Neoclassical interpretation

When the Web of Value is understood to mean trading between individuals, and the value of an asset is expressed in price. Price is mainly determined by the asset's scarcity (as in the case of non-fungible tokens) and by its utility to buyers; this could be understood as a neoclassical approach to value. Neoclassical economics has dominated micro-economics since the 1950s and together with, first, Keynesian and, later, New Keynesian economics has formed the 'neoclassical synthesis', constituting what is understood as contemporary mainstream economics. Its view of value creation makes a few specific assumptions: firstly, that all buyers are universally capable utility calculators who know what is best for them and what price to pay for a given asset, given its utility and scarcity; and, secondly, that monopolies are not able to interfere in the market by price-setting. Such assumptions have been questioned by scholars within heterodox economics, especially those working within evolutionary and institutional economics.³ Their critique of monopolies has been relevant in the context of both contemporary finance (dominated by banks) and the internet economy of information goods (dominated by platforms). Banks and platforms are seen as centralised institutions whose semi-monopoly po-

3. Evolutionary and institutional economics argue that any buyer rationality is contextual, depending on institutionally or culturally framed value systems, as well as on interactions with others representing those differing value systems or interpretations of utility. It has been demonstrated to apply especially in the case of information or cultural goods, where value perceptions depend on networked communicative activities with others (Potts et al., 2008). Both approaches have been addressing how the evolution of monopolies and other institutional continuities could limit degrees of freedom to price action.

sition is enabled either by state regulations (licences to banks) or the specific features of internet economies (network effects, multi-sided markets). Their dominance is seen as a distortion of markets and is understood to have motivated various kinds of blockchain-enabled decentralisation efforts.

While the ethos of Web3 is about decentralisation, it has been suggested that defining value through price and scarcity encourages speculative activities that are not processes of value creation, but mere value extraction. Mazzucato (2018b, p. 221) has critiqued that Web 2.0 platforms typically have not created value themselves, but have been able to extract value from the contributions of others on their platforms. This has been possible due to the network effects of these platforms and their control over the multi-sided markets they have facilitated. That is, they have been in the position to extract value from the data-resources at their disposal. In the case of Web3, a risk could emerge again when internet content or services (e.g. books, videos, videogame accessories, licences, tickets, etc.) are turned into financial assets. The focus remains on value extraction in the form of resulting operations with those assets, and the development of various financial instruments (derivatives such as futures, swaps, etc.), which could be compared to the 'financialisation' of the real economy and its known risks. These include: a focus on short-term profits instead of long-term investment; a gradual transfer of assets into the hands of the few; non-productive rent becoming a dominant activity; and the emergence of monopolies. All this, in effect centralisation of resources (tokens of various kinds) instead of decentralisation, could limit wider access to cultural/information services and to participation in value creation (Lotti, 2018).

The emergence of monopolies is typically seen as undermining productivity and wider value creation since monopolies exploit their position to seek rent. Ricardo (1817) was the first to define rent as a reward for the ownership of a resource, but not as a contribution to societal wealth creation. In the context of Web 2.0 it has been the ownership of dominant platforms, typically following early entry into a specific digital services market and the resulting network effects and the eventual (semi-)monopoly status of the platforms, that has enabled similar rewards to be sought (Christophers, 2020, p. 182; Mansell & Steinmuller, 2020, p. 38; Sadowski, 2019; 2020). The potential wider financialisation in Web3 could bring about similar dynamics, as early elite investors could gain control over majority stakes in available assets (Zook & Grote, 2020).

Yet, blockchain-based financial ecosystems were created in opposition to centralisation in financial markets and value extraction via rent, that is, in opposition to banks 'creating money' (issuing debt without necessary reserves). This opposition

to monopolies, especially content mediation platforms and their value extraction practices, could still be seen as the driving ethos of the Web3 industries (Jin et al., 2022). Nakamoto's (2008) proposition for the transparent and collective appropriation (block production and network governance) of the means of monetary production has been seen by some as echoing, paradoxically, Marx's call for the collective appropriation of the means of production (Alizart, 2020). This suggests that the neoclassical interpretation of how value ought to be created in the Web of Value is neither prevalent nor without alternatives.

To summarise: the neoclassical approach to value emphasises how value equals price, and how price depends on perceptions of scarcity and utility. From this perspective, the Web of Value refers to the technological apparatus where the scarcity of an asset is always clear, as is its resulting price – when all assets and transactions can be accessed on public blockchains they become a matter of public record, together with their history (which communicates the evolution of their perceived value and utility). The risk in this particular perception of value is that it focuses on market speculation and value extraction, which may lead to excessive financialisation of the internet economy.

Heterodox interpretations

Institutional and evolutionary economic approaches emerged in the course of the early 20th century and today form the leading approaches within heterodox economics. They present an alternative to mainstream economics while focusing mainly on the phenomena of change and innovation. One of the central contributions from these approaches has been the linking of communicative action (meaning systems), community evolution and the values that emerge in such communities with the concept of economic value. When neoclassical economics understands the purpose of economics as studying the production and distribution of scarce resources then institutional economics understands the economy as being made of rules set by all kinds of institutions and communities. Building on Veblen, Commons and Dewey, the neo-institutionalist Marc R. Tool (1979), for instance, argued that economic value is expressed in 'the continuity of human life and the noninvidious recreation of community through the instrumental use of knowledge'. In this view, values or related perceptions of utility are never individual, but are constituted by the communities via communicative means. Both digital ledgers and money are important media for coordinating such communication.

That money is another medium (of value) has been highlighted since Aristotle. But it can only function as a medium of value communication when it is used for pay-

ments. Swartz (2020, p. 16) argues that communication through payments knits humans together in a shared economic world: transactional communities. Members of such communities might share imbricated senses of identity, geography, temporality, discourses, politics and practices, but they must all share a belief in the particular money as a medium of value. What, how and when is typically bought and sold for this money distinguishes transactional value communities. 'When we exchange money, we agree not just on its quantity but on its meaning. The technologies of money – which make it transactable and valuable – are mechanisms of maintaining these shared understandings' (Swartz, 2020, p. 18). Swartz posits that in the contemporary technological environment we should talk about money and payments not just as media but as 'social media' – referring to the participatory and communal nature of many of the contemporary payment technologies and platforms. These technologies have 'memory': transactions are recorded, often publicly, and this makes transactional communities visible and purchases explicit, in order to communicate the sociality and values attached to the transactions. Such public communications start functioning self-referentially; the community 'auto-communicates' (Hartley et al., 2021, pp. 79-82) and it becomes aware of itself. Yet, the firms that run the payment systems of Web 2.0 type platforms (Venmo, WeChat, AliPay) have control over such community auto-communications and their communal memory-making and, therefore, self-creation. It is in this context that distributed ledgers have emerged as an alternative governance apparatus, as they facilitate a distributed transactional memory that could enable transactional communities to become autonomous and self-coordinating.

The evolution of transactional communities with their own distinctive memories and value systems could also be understood in the growth of blockchains, their coins, other tokenised assets and in the emergence and multiplication of decentralised autonomous organisations (DAOs; see Hassan & De Filippi, 2021). Blockchains and DAOs (especially when the latter issue their own tokens) become distinct transactional communities because they are linked by a shared medium of value. As participation in such networks is typically rewarded by the network's money or other assets, loyalty to the network is architecturally enforced. Alizart (2020, p. 37) emphasises that as blockchain participants all have roles (as block creators, validators, etc.) they are not merely utility receivers; rather, they are network owners and in the same way its 'civil servants'. In this way, what is private and what is public converges in effect. DAOs could be seen as providing new technological affordances to the operations of economic co-operatives, but may also present the risk of financialising all their operations (Schneider, 2022). Nevertheless, this perspective suggests that Web3 could emerge as a constellation of novel

institutional forms (Berg et al., 2019), tied by distributed ledgers as new value media with the potential to improve wider participation in value production, especially with regard to information goods, such as media content and cultural services. The multiplication of such communities could lead to further diversification of value systems.

To summarise: there is a view, based on versions of institutional and evolutionary economics, that value is collectively produced and value systems are specific to communities, and that blockchains are not only making this explicit but enforcing the multiplication of such systems in the economy. The Web of Value could henceforth refer to the Internet era when such multiplication takes place through the broad implementation of monetary self-governance and decentralisation technologies.

Classical approaches to labour as value

Decentralisation technologies could also once again make relevant what are known as classical approaches to value creation. The classical economists Adam Smith, David Ricardo and Karl Marx highlighted that value is initially created by labourers – those who produce something that could have exchange value in the market. They all criticised, in various ways, forms of rent-based value extraction. Their critiques evolved at different stages of early industrialisation, when the role of individual labour in value creation became gradually less clear. This process has culminated in the digital economy, where value is created in collaborative processes by multitudes of diverse actors, but where individual contributions are often difficult to trace. As a result, labour has become immaterial, untransparent and immeasurable (Hardt & Negri, 2005), thus strengthening the neoclassical, demand-based view of value creation. The difficulties in identifying and measuring cultural content creation labour have arguably led to exploitation, insecure and uneven rewards to labourers (Dal Jong & Feenberg, 2015; Duffy, 2015; Terranova, 2000) and has empowered the positions of centralised intermediaries, such as large platforms, broadcasters and publishers.

In this context, one of the imaginaries related to the Internet of blockchains is the ability to record labour by means of smart contracts. It builds on Locke's (1690) concept of 'just deserts'; that is, in an economic system in which individual labour is important, it is possible to identify and then condition just rewards. While much of the technological innovation, especially recently, has focused on surveilling labourers (Böhm & Land, 2012; Moore, 2019), the situation could be understood as potentially different with public blockchains. With smart contracts, digital labour

could be traced across a supply chain, and who produced or repurposed what would be on the public record – in effect open data. It could become evident how value is built when each of its components is contributed by, for instance, independent labourers and small firms. To bring this about, governments have started to set up blockchain-based digital infrastructures of registries that would underpin cultural production ecosystems (for instance, copyrights registries). These could enable identity management, data security, asset provenance, contracting and value transfer (Potts & Rennie, 2018; Norta et al., 2018). There are several such projects currently in development in the EU, Australia, etc. These are typically understood as base-layer infrastructures enabling the further operations of Web3-type cultural industries.

To summarise: there is an expectation that decentralisation technologies could highlight the role of individual productive labour in value creation and, in doing so, undermine the dominant methods of unproductive value extraction in digital markets.

Public value

Studies of economic value have always featured discussions on the distinction between public and private value. Aristotle, for instance, distinguished between exchange value and use value (potentially by all members of the public). As suggested above, these distinctions could become blurred in blockchain governance and in how blockchain networks create value. Contemporary studies of public value creation first emerged in response to *New Public Management Theory*, which was driven by the aim to make the public service more ‘businesslike’ and to improve its efficiency by using private sector management models – in line with ideas within neoclassical micro-economics. The proponents of the public value theory (Moore, 1995; Benington & Moore, 2011; Mazzucato, 2018a; 2018b; McBride et al., 2019) have instead focused on the role of governments or public agencies as dynamic innovators and co-creators of value in the interest of the wider public. While Moore and Benington (2011) have emphasised that governments ought to secure a functional public sphere where shared values are agreed upon and then pursued collaboratively by multiple agencies, Mazzucato, based on the ideas within evolutionary economics, has highlighted the public sector as a risk-taker and innovator in the interest of the wider society, including private sector innovators.

Such focus on the public sector could be seen as being in contrast with the ethos of the decentralisation technologies that have been about avoiding dependence on the centralised authority of government. Yet, we propose that the public value

concept is relevant in interpreting the Web of Value promise from another angle. This is, firstly, because all public blockchains could be understood as being providers of public value: as technological infrastructures, they provide non-discriminatory use value to all parties. Secondly, as peer-to-peer technologies, they presume the pooling or sharing of resources, a commitment to a common purpose and contributions to their governance. This brings about the blurring of private and public, as discussed above.

Also, as discussed in the previous section, rationales exist for governments either to use blockchain technologies or to contribute to autonomous initiatives when they see that a particular network or infrastructure could create broader public value to society. One example of this is the European Commission's blockchain strategy, which foresees the development of the European Union's own public services blockchain, which would be interoperable with private sector (public) blockchains. Such potential interoperability follows the understanding of Benington and Moore (2011, p. 15) that, in complex digital economies, public value emerges from the interconnections and interactions between heterogeneous sets of parties, sites and networks. The role of government therein is not one only that of a rule-setter or service provider for various value creators, but of a proactive shaper of the public sphere, interlinking parties and directly creating (public) value. In the context of Web3 development this could mean that government-provided ledgers (with regard to securing data on identities, asset provenance, rights, legal statuses and other contextual aspects) provide use value to all network participants, but in the process it could also limit the potential financialisation of interactions within the Web3 space.

To summarise: when interpreting the meaning of the Web of Value, it is important to distinguish the concept and functions of 'public value' and the role of public agencies in the broader 'value ecosystems' of Web3.

Conclusion

The term Web of Value typically refers to a forthcoming era where most internet content and services are tokenised and turned into assets to be traded. This implies that the value of those assets emerges during trading, at equilibrium points determined by both the scarcity of assets and their demand by and utility to buyers. This interpretation should be recognised as a neoclassical approach to value, which could drive the financialisation of the internet economy. Building on classical political economy and heterodox economics, it is possible to demonstrate alternative ways to interpret value creation in the Web of Value. Based on these, dis-

tributed ledgers could be used to highlight the role of labour in value creation and to empower workers. Decentralisation technologies could also be used to highlight how value is produced communally, facilitating the multiplication of value systems. Lastly, novel forms of decentralised governance could facilitate a partial convergence of public and private value creation and lead to new ways for public agencies to provide public value on the internet. However, all the various interpretations of the Web of Value promise competing imaginaries for the design of the future internet, central to which is the concept of value. As Mansell (2012) has shown, all the competing imaginaries, even if in conflict, end up in (interdisciplinary) dialogue and contribute to the shaping of the future internet.

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