

Social Media, News Media, and the Democratic Deficit: Can the Blockchain Make a Difference?

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Abstract: This article explores the potentials of blockchain technology to alleviate and/or intensify some of the problems of the information and communication sector. Divided into four sections, the article first explores the democratic deficit within the context of an informed citizenry. This section includes a study of the current public sphere, post-truth politics and populism. Secondly, the article addresses the current information and communication system by investigating today's social media and an ever-changing digital news media landscape. Thirdly, it explores four prevalent approaches toward reforming the information and communication system: fact-checking and debunking, media literacy, regulation and policy reform, and self-regulation. And fourthly, it addresses the central question of the study, which concerns blockchain technology. This disruptive database technology has potential to offer solutions to regaining trust in the information ecosystem, yet like other approaches, when placed within existing socio-economic structures, it falls short in reversing the democratic deficit.

Keywords: democracy; social media; news media, blockchain; disinformation

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1. Introduction

Democracy requires an effective and functional information and communication system that informs and engages with citizens in trustworthy ways (McChesney 1997). Currently, this system is wavering, and as a consequence, it is causing a series of moral panics (Jungherr and Schroeder 2021) granting mainly alt-right populist movements the opportunity to develop and threaten erstwhile democracies (Dahlgren 2018; Iosifidis and Andrews 2020). The fickle nature of the public imagination across democracies is not a novel concept (Goode and Ben-Yehuda 2009), yet this level of obfuscation is unprecedented (Newman et al. 2021).

At the heart of the problem are digital communication technologies that have created a series of concerns requiring immediate attention. These include but are not limited to cybersecurity, disinformation, harmful content, privacy, and surveillance. Many of these phenomena hide behind two cherished democratic values: tolerance and freedom of expression (Turner 2003; Iosifidis and Nicoli 2021). The task at hand is to deconstruct the landscape in real time and offer ways of reversing democratic backsliding without compromising these basic democratic principles before democracy itself fades into obscurity. Many of these concerns have been facilitated by capitalism's palpable drawbacks (Sørensen 2022) and staunch reluctance to reform itself,

thus creating a handful of unconstrained, lightly regulated technology conglomerates (see Fuchs 2009; Srnicek 2017; Flew 2021a). Indeed, critical political economists have been warning of the consequences of an information and communication system too reliant on advertising, consolidation, deregulation and free-market policies (Garnham 1990; Golding and Murdock 1997; Mosco 2009; Winseck and Jin 2012; Hardy 2014; Fuchs 2021).

This article focuses on phenomena that highlight the democratic deficit, the information and communication system acting as the catalyst of this deficit, and the methods currently applied in reforming them. Divided into four sections, the article first defines the public sphere and addresses recent events that have led to what we define as post-truth politics and populism. It next addresses the current state of social media and news media, positing that since the outbreak of COVID-19, trends pertaining to populism and post-truth politics have accelerated and precipitated new concerns, such as added social polarisation and increased demand for reputable news media. The article next seeks to deconstruct four collective methods used to improve and reform the current information and communication system; these are fact-checking and debunking, media literacy, self-regulation, and regulatory reform policies. The final section addresses the central research question of the article: whether or not blockchain technology can offer solutions in alleviating the information and communication system.

2. The Democratic Deficit

2.1. The Public Sphere

In contemporary democratic societies, information is typically spread to citizens via the media, whose role in public communication is vital. The concept of the public sphere as conceived by political theorist Jürgen Habermas (1962/1989) provides the framework for enabling citizens to understand the connection between the media and democracy, that is, how to engage in civic communication. The concept has frequently been dubbed idealistic and criticised regarding its 'rationality' principle (see e.g. Dallmayr 1988), but Habermas' theory provides the basis for acknowledging the key role of media outlets in public communication. In the contemporary, global, diverse and multicultural society, the public sphere is said to take on a universal dimension that takes account of cultural differences, social complexities and technological advancements. In effect, discussions surrounding the public sphere have received renewed attention with the appearance of the Internet, social media and digital media platforms, all of which enhance communication spaces where debate occurs (Iosifidis 2020).

Optimism surrounding digital media as an emancipating public sphere during the early days of the Internet has eroded over the past decade (Zuboff 2019; Fuchs 2022). Signs of the democratic deficit began approximately at the same time (see Norris 2011). Despite growing pessimism over digital media and a legitimacy crisis of democracy, the uptake of digital media is unparalleled (see Section 3). Indeed, an overabundance of both demand and supply of social media content has made it difficult for citizens to objectively comprehend who and what to trust. The paradox is that access to information is one of democracy's most vital components. The right to access information held by public bodies, or freedom of information, is an integral part of freedom of expression, as recognised by Resolution 59 of the UN General Assembly, adopted in 1946 (UN General Assembly 1946), as well as by Article 19 of the Universal Declaration of Human Rights (UN 1948), which states that the

fundamental right of freedom of expression encompasses the freedom “to seek, receive and impart information and ideas through any media and regardless of frontiers”. The World Summit on the Information Society (WSIS 2003) reaffirmed the right to freedom of opinion and expression in the knowledge economy. Dahlgren defines the post-Brexit, post-Trump information landscape as an “epistemic crisis of public spheres” (2018, 20).

2.2. Post-Truth

Social-media-driven global diffusion of disinformation and misinformation can be problematic and lead to the unchecked circulation of ‘post-truth politics’. There have been several studies examining the influence of disinformation on the outcomes of both the 2016 US Presidential election and the 2016 UK referendum on EU membership. Fuchs (2017) analysed the Twitter output and influence of the successful US presidential candidate Donald Trump, while the British prime minister Boris Johnson’s former chief adviser Dominic Cummings (2017) emphasised the repeated focus on xenophobic claims during the Brexit campaign in the UK. Britain’s EU referendum demonstrated that social media offer an effective mechanism for shaping the public agenda, forming public opinion and driving social change. Alongside Trump’s shocking win, the vote for Brexit was obtained in what has been termed the epoch of ‘post-truth politics’ (Iosifidis and Nicoli 2021), primarily characterised by fake news, inaccurate statistics and the manipulation of people’s emotions in the absence of factual evidence. Eventually, social media platforms and online debates deceived the people and created unfounded public concerns, which in turn influenced the UK electorate’s political thinking. As Iosifidis and Andrews (2020) note, post-truth in politics is one of the drivers of populism, and as such can harm democracy.

2.3. Populism

The rise of populism and especially right-wing populist parties in many areas of the world has been seen as a reaction against the global policies of the last 30 years or so in Western liberal democracies and beyond (Iosifidis and Andrews 2020). The successful campaigns of populists can be attributed to a combination of factors, ranging from economic insecurity, to growing inequality in wealth distribution, to cultural change and shifts in traditional values and norms, to immigration: all of which have generated a broader concern that globalisation can shift power to transnational elites (Flew and Iosifidis 2020; Maniou and Bantimaroudis 2021). Populism as an ideology in contemporary politics has been associated with nationalism, but also with the rapid growth of social media platforms by politicians who claim that these outlets offer an alternative voice to mainstream media, which have been captured by elite consensus politics. According to Flew and Iosifidis (2020), this complicates the relationship between truth and free expression in an age of social media, meaning that we need to account for the role of such platforms in the rise of populism and ‘post-truth’ politics, as well as its scope to advance the goals and strategies of progressive social movements.

3. The Present State of the Information and Communication System

3.1. Social Media

COVID-19 has taken the lives of millions of people and continues to be a major health threat around the world. Due to the health consequences that this virus brings about, the pandemic has also impacted many, if not all, structures of contemporary

life. In addition, the Russia–Ukraine conflict has exacerbated the already dire state of the planet. The disruption of world economies has had inevitable consequences on supply chains and sectors such as hospitality and leisure. Yet the contraction of some sectors has facilitated the advancement of others. Many entities from within the digital economy sector have grown to unprecedented levels, as individuals have had to rely on digital communication technologies to stay in touch with others and with their communities. Digital platforms have become the cornerstone in people’s evolving communication behaviours and information consumption (Aral 2020). There is no doubt that over the past two years societies have become more reliant on digital platforms.

Since the pandemic and the Russia–Ukraine conflict, an even more obfuscated information and communication system has been emerging, pushing societies further still from a Habermasian ethos of the public sphere and the legitimisation of democracy in post-war Western societies. The current ecosystem may have not only accelerated existing trajectories, but also created new concerns that deepen existential threats of liberal democracies. Political online discourse over the past several years has been facilitated primarily by far-right echo chambers (Guess and Lyons 2020). These have often been exacerbated by fake sites driven toward hyper-partisan digital disinformation (Barberá 2020; Masullo and Kim 2020). Political disinformation, post-truth politics, political polarisation, and growing populism have all compounded since 2020 (Eberl et al. 2021). Under the rubric of freedom of expression, communities of like-minded individuals have assembled online, confirming their biases and strengthening their ideological beliefs and identity politics. Yet the new system is not restricted to online political and ideological discourse. Online content now extends to include more social issues still relevant to democracy. These relate to migration, prejudice, racism, xenophobia (Rowe et al. 2021), heightened vaccination hesitancy (Puri et al. 2020; Wilson and Wiysonge 2020), conspiracy theories (Eberl et al. 2021) and a hatred toward all things Russian portrayed through many Western media (Papanikos 2022). It has, as a result, caused increased psychological distress, mainly amongst Gen-Z users (18–24 years old) (Liu et al. 2021a). Put another way, in addition to political discourse, online content has metastasized to create a more elusive and precarious socio-cultural environment (Rosen 2022). Lacking the editorial oversight associated with legacy news media, the pandemic-era information and communication system, characterised by an abundance of largely unregulated (or unchecked) social media, is becoming too complex to govern.

3.2. News Media

Social media profits have soared over the past several years. Conversely, media groups have been hit with heavy losses on account of sharp drops in advertising revenues and live sports events during the early stages of the pandemic. The biggest hit has been taken by news media, including public service media, a system normatively not reliant on advertising and economic cycles, but nonetheless attacked by right-wing populist governments (Sehl et al. 2022). In democracies around the world, news media have had to deal with an estimated 40% reduction in job losses following an already hard-hit period spanning several decades (Flew 2021b). This is despite the high demand in news due to a demonstrable newsworthiness of both the pandemic and the repercussions of the Russia–Ukraine conflict. The main reason behind this demand is an increase in people’s need for orientation during crises (Van Aelst et al. 2021). Recent news consumption has been higher than messenger/chat usage, programme/film watching, and social media consumption (Newman et al.

2021). Moreover, demand for quality news content remains high in most countries, but since such content is locked behind paywalls, most users choose alternative channels. Wealthier citizens, mainly from richer nations, remain an exception, with many turning to subscription-based news content from reputable news brands; nonetheless, most citizens, particularly younger cohorts, continue to rely on social media for their news consumption or turn to free news content from news apps or websites (Newman et al. 2021).

Although news consumption has grown, trust in news has not done so proportionally. In fact, trust among users who receive their news from social media platforms or searches has in many cases dropped due to the amalgam of established news brands with alternative and fake news sources (Iosifidis and Andrews 2020). The necessary coexistence of quality news with poorer options has no doubt contributed to the mistrust of news media accumulated over the past several decades (Fisher et al. 2020). Furthermore, the algorithmic logic driving social media timelines favours sensational and emotional content that reputable news brands try to avoid (Napoli 2019). Together, these factors contribute to the disorder of social media that ultimately deteriorates people's levels of trust in what they consume. Again, the exception to this trend is that trust levels have fared better with users who consume news from well-known and reputable news brands rather than via social media platforms (Newman et al. 2021; Flew 2021b).

4. Reforming the Information and Communication System

Reforming the information and communication system is one of the most challenging undertakings of liberal democracies (Bennett and Livingstone 2018). Currently, there are several approaches to do so within a digitalised landscape. Yet as democracies around the world continue to backslide and the information and communication system becomes increasingly obscure, more effective methods are required. Iosifidis and Nicoli (2021), focusing mainly on disinformation and digital democracy, identify five approaches to how deviant phenomena within the system are tackled. Four are addressed in this section, while the fifth, blockchain technology, is analysed in more detail in the following section. While these approaches aim to combat disinformation, they offer little where users share disinformation due to inertia, ignorance or laziness (Pennycook and Rand 2018), or to engrained "problematic partisan information [...] on a continuum with mainstream partisan media" that continuously reaffirms fake news and existing beliefs (Marwick 2018, 501). By extension, these approaches are ineffective if shared over platforms that are harder to track, such as WhatsApp or Telegram (Aral 2020).

The first approach involves fact-checking and debunking. Determining the correctness of factual statements can be achieved either via human-based efforts or, increasingly, through automated systems (Kotonya and Toni 2020). Several challenges arise with fact-checking, as the sheer size and speed of information has become too demanding to do so on a continuous basis. It also omits the critical process involved of the consumers of the message judging the veracity of the information itself. Debunking, myth-busting and rebuttals entail a separate set of challenges, as the nature of exposing falsehoods and communicating truthful alternatives does not guarantee positive solutions (Lewandowsky et al. 2017). Most misinformation continues to influence its audiences via a process known as "continued-influence effect" (Gordon et al. 2019).

The second approach consists of media literacy. The National Association of Media Literacy Education defines media literacy as "the ability to access, analyze,

evaluate, create, and act using all forms of communication” (NAMLE 2019). One of its underlying components is that there are no easy solutions to alleviating the effects of destabilising phenomena on the public sphere. As information from digital sources increases, we are required to better access and identify good and bad information, understand it and think critically about it. As more people around the world increase their media literacy, more trustworthy news and information will overcome less trustworthy information (Craft et al. 2017). Yet media literacy requires vast amounts of resources and access to the right audiences. Many vulnerable groups consuming misleading online content are part of a senior generation who are not accurately informed and are comparably less media-literate than younger cohorts. Furthermore, Guess et al. (2020) argue that empirical evidence is insufficient in determining whether real-world consumption of false news is countered properly following media literacy training.

The third approach concerns the self-regulation of digital media. Engrained within liberal democracies is the idea of a free press and freedom of expression. This is conveyed in the way the policies pertaining to the public Internet have been developed. The most prominent account of this ethos is the US Section 230 of the Communications Decency Act. The act has provided strong immunity for today’s digital platforms of content provided by third parties. In essence, the legislation shields large platforms from liability for content that users post, shifting regulatory issues away from regulatory bodies and toward the platforms themselves. In turn, this has created an environment whereby platforms are left to design their own policies to handle misleading online phenomena. Self-regulation of the information and communication system is also seen in the way the EU has tackled disinformation thus far. The bloc’s major legislation, the 2018 Code of Practice on Disinformation, stops short of applying direct regulation on digital platforms, restricting itself to recommendations and minor amendments concerning issues of transparency (see Iosifidis and Nicoli 2021). Yet the pandemic has exposed the weaknesses of online platforms’ self-regulation, as social media remain largely to blame for most health misinformation (Shahi et al. 2021).

The fourth approach, regulating the digital economy sector, is building momentum around the world. The most widespread form of digital platform regulation involves efforts in antitrust enforcement (Khan 2020). As large technology firms grow in dominance, concerns over fairness in competition, high concentration, network effects, and an overall lack of economic democracy are rising. Despite the recent revamp of antitrust enforcement, efforts have thus far been insufficient. It is difficult to identify whether this is due to big tech’s efforts to push back legislation or to challenges in regulating a sector so palpably linked with freedom of expression. But regardless of how concentrated the sector is or how strong barriers to entry have become (Winseck 2020), there are no clear signs of actual antitrust enforcement of large technology firms. The EU’s Digital Services Act Package has been tipped to challenge platformisation through regulation (Flew 2021a), albeit neoliberalism’s persistence in competition policy placing consumer welfare above other forms of public interest (Dunne 2020).

5. The Blockchain

5.1. Characteristics

A blockchain can be considered a distributed electronic ledger of any type of transaction, where a transaction is the exchange of any kind of data, such as news content,

instructions such as orders to buy or sell something, or digital training certificates. Whether private or public, a blockchain system records information and continuously verifies and re-verifies new transactions, making it nearly impossible to alter information after it has been created. As the technology has evolved, its potential has been explored across different capacities either to improve current practices or to create new ones. New blockchain models and markets are emerging in a wide number of fields, including smart contracts, the Internet of Things (IoT), cyber-security, machine-to-machine transactions, and social media (Nofer et al. 2017).

The idea is often formulated as ‘removing the intermediaries’ and creating a peer-to-peer network (P2P) where a transaction is made directly between two parties. What makes the technology relevant for the information and communication system is that due to its immutability, security, tamperproofing and P2P design, the blockchain can confirm information credibility and reliability for social network platforms (Chakravorty and Rong 2017). Instead of being managed by a single centralised authority, the blockchain is stored in multiple copies on multiple independent computers within a decentralised network so that no single entity controls the data (Casey and Vigna 2018). Data are organised in a chain of blocks of a specified size, in chronological order. Each block is cryptographically linked with other blocks using pointers. As more data are added, the blockchain grows. Any attempt to modify a block breaks the cryptographic links, disrupting the whole chain. This entails that once a transaction is written, it cannot be erased or altered, thus ensuring the integrity of the data. Each node on the chain keeps a copy of the blockchain. Most of the nodes must agree for a new transaction to be registered on the blockchain.

Users’ data are better protected in a decentralised manner, as third parties are removed, ensuring users have control over their own data. The improved privacy and security mechanisms of decentralisation, along with its ability to implement contractual P2P agreements (smart contracts) without the need of a third party, enable trust-based information exchange systems. Redesigning social media outlets using blockchain technology has the potential to build trust and protect digital news content. These solutions harness P2P capabilities of blockchain technology and allow secure, decentralised, anonymous and traceable content.

Although the technology is known for the transfer of cryptocurrencies, blockchain enthusiasts believe the technology can offer solutions to numerous societal issues. These include ameliorating inequalities, empowering citizens to monetise their personal information, improving on numerous services due to the removal of intermediaries, and leading the way towards the design and development of a society based on the good of the commons in several sectors, including agriculture, green energy, healthcare, logistics and the media. Indeed, blockchain technology is considered a solution that can solve many of the complex challenges associated with digital harmful phenomena, particularly those created by disinformation and the decline in trust in news media (Harrison and Leopold 2021).

The difficulty in reversing the spread of disinformation on current platforms is in not knowing the source or the lifecycle of content from sender to receivers. The blockchain removes this challenge, since any change in the original content is recorded. The main characteristics of blockchain technology are listed in Table 1.

Blockchain Characteristics	
Decentralised	No centralised control. Data on a blockchain exists in all nodes.
Shared	Two or more parties (or systems) are involved in a blockchain.
Transparent	Unlike centralised systems, blockchains offer complete transparency. In a decentralised network where there is no need for any centralised authority, since every node has a copy of the ledger, the transparency of the entire system is improved.
Time-stamped	Transactions are stored in chronological order and are therefore traceable.
Append-only	Only new transactions can be added to a blockchain.
Immutable	Once a transaction is added to a blockchain, it cannot be erased or modified.
Cryptographically-secured	Advanced cryptography enables tamper-proof records, security and secrecy.
Smart contracts enabled	A blockchain can be programmed so that certain conditions are met. A smart contract is an agreement implemented using software. The code itself, enforces and monitors the agreement if specific conditions are met.
Consensus-driven	Data are verified independently via a consensus algorithm, which in essence provides the rules for validating the information for a transaction.
High security provided	Blockchain technology offers high security since transactions are cryptographically secure, at the same time providing data integrity. Thus, instead of relying on a third party, trust is placed in cryptographic algorithms.

Table 1: Blockchain characteristics (Chen et al. 2018).

5.2. Blockchain-Based Research Examples

Blockchain-based solutions towards news and user content are growing. Solutions involve publishing content that relies on a blockchain system in a chain of transactions. The EUNOMIA platform, a H2020-funded project (<https://eunomia.social/>) operates in this manner, providing a user-oriented, secure, trustworthy and decentralised social media platform for enabling the user to identify a post's origin and to evaluate the propagation of the post, in this way protecting the network. The EUNOMIA consortium has designed and developed a decentralised open-source platform for social media users to enable them to actively participate in the trustworthiness verification process. Social media users are empowered in a decentralised and democratic way by contributing to the information that is published. The project has been designed so as to provide a blockchain-based governance service for authoring network participation. In this way, the participating entities of the network can vote and agree on whether a new organisation should join the network or whether a participating one should leave the network (Monachelis et al. 2020).

Ushare, proposed by Chakravorty and Rong (2017), is a theoretical solution for creating a user-centric social network that enables users to control, trace and securely share content. The platform is supported by blockchain technology with decentralisation, anonymity, traceability and censorship resistance. It supports offsite encryption of data and mechanisms in order to share them through the blockchain. The

functionalities of Ushare are based on the blockchain component that keeps a record of ownership of data items and the number of shares made. Chen et al. (2020) uses the concepts of a customised Proof-of-Authority consensus algorithm, along with an incentive mechanism and gamification, to determine the integrity of fake news. Such an approach can be extended to other types of digital content. Their protocol was simulated on two datasets of tweets, with satisfying results. A blueprint of a blockchain-based framework that relies on smart contracts for the detection and prevention of fake news has also been presented by Qayyum et al. (2019).

5.3. Opportunities

The current information and communication system has limited mechanisms for guarding user trust across digital content. As described in previous sections, current concerns eroding trust include advertising fraud, content moderation, the management of data and digital rights, and conflicts of press freedom and surveillance (Zuboff 2019; Flew 2021). As most platforms are predominantly centralised and provide opportunities for exploiting these concerns, blockchain technology can be used for keeping content private and secure (Dutra et al. 2018). Blockchain technology, with a distributed ledger and decentralised concept, secures users' content by encrypting it. Moreover, blockchain-based platforms empower users to gain control of their content (Qayyum et al. 2019). Such platforms enable transparency, immutability, and traceability of posts, further enabling users to determine if a post is fake or not. Blockchain-enabled applications can trace the authenticity of news from source to present state, registering any alteration, deletion, or omission. The aim is that as more content is placed on the blockchain, agents will be prevented from generating disinformation. *The New York Times*, for example, is exploring blockchain technology to keep track of the lifecycle of the metadata of content such as photographs, thereby protecting the content from its creator to its users (Harrison and Leopold 2021).

Current advertising digital models, motivated by an ability to target users and driven by users' privacy data, include numerous intermediaries. Blockchain technology's features allow for new platforms to mitigate the above issues (Liu et al. 2021b) and can allow users to opt out of being manipulated toward consumption or voting preferences.

The blockchain further offers solutions for the copyright of content where one should have sole rights to distribute, lend, reproduce, and transfer digital content and different variations of it with different users. The blockchain enables the organisation and storing of tamper-proof data shared among members of a network, and with smart contracts, one can use complex copyrights agreements and provide automated benefits with efficient historical searching. In this way, digital content can be handled by different people according to their rights. Moreover, the use of Non-Fungible Tokens (NFTs) are based on the blockchain and can therefore be used for securely tracking, transferring, and supporting the ownership of digital assets (Chalmers et al. 2022). Furthermore, blockchain technology, being one of the founding components of the metaverse, gives rise to new applications where users can create their own avatars (Le 2022). Other opportunities involve scalable blockchain-based solutions for fact-checking through incentives. In such environments, content creators will also be incentivised to submit content for validation.

5.4. Challenges

Reengineering the information and communication landscape with blockchain technology is not without limitations. At present, the validation of transactions is slow and

expensive (which is not conducive to news media), while energy costs remain high and environmentally detrimental. Furthermore, the cryptography supporting blockchain technology is vulnerable to attacks from quantum computers. This means that resources need to be invested into post-quantum blockchains, cryptography algorithms which are quantum resistant (Raja and Visser 2018). Such platforms should take into consideration technological developments expected to occur within the lifespan of any potentially deployed system.

Another challenge involves data protection. In blockchain technology data protection is by design. This produces conflict with its transparency characteristics. The right to be forgotten, another fundamental human right, conflicts with the irreversibility and immutability of blockchain records (Politou et al. 2019). Related laws (e.g., the EU's GDPR) globally present a challenge for blockchain technology implementations. Designing and developing fully compliant blockchain solutions may not be feasible. 'Midway' solutions could be designed and developed by shifting the focus to the similarities of related laws and the technology for new approaches and interpretations (Tatar et al. 2020).

Smart contracts are one of the most significant building blocks of a decentralised application. Regardless of the potential of smart contracts, several concerns exist regarding their adoption. These include security threats, weaknesses, and legal issues. For example, some smart contracts may require 'off-chain' data. Trusted third parties called 'oracles' are used, yet may introduce new points of failure. Another concern for smart contracts is the immutability characteristic inherited from the blockchain. In case of errors in the code, this feature may prevent the contract from being corrected. Scalability issues, that is, the number of transactions that can be carried out per unit time, may lead to network congestion. This stems from the consensus algorithms that play a major role in the security, scalability, and decentralisation in blockchain technology.

5.5. Socio-Economic Concerns

Blockchain technology has significant potential to strengthen a decentralised cooperative movement that extends beyond building trust in news media and social media content moderation. Yet, like current digital systems, the technology is built within existing neoliberal economic structures by communities of people, the majority of whom are driven by the logic of markets. As Manski (2017) notes, "incumbent and new industries are emerging that are using blockchain technology to reinforce established positions. Venture capitalists, global accounting firms, big banks, and traditional state actors are already engaging in some blockchain practices that tend toward exclusivity, stratification, deregulation, and corporate sovereignty" (517). The current political-economic structures of capitalist society offer fewer opportunities for the technology to be used for advancing a holistic global commonwealth and public interest initiatives (see for example the Public Service Media and Public Service Internet Manifesto; Fuchs and Unterberger 2021) than for capital accumulation and profit generation. For example, while the technology might mitigate digital advertising structures, audiences are still perceived as a commodity (see Smythe 1977). Adoption of the technology might also create an augmented reality where the avatars of next generations spend much of their time getting educated, taking part in meetings and enriching healthcare and financial systems, while those leading these innovations, like Meta, who has completely pivoted toward the metaverse, are ultimately driven by shareholder pressure (Iosifidis and Nicoli 2020).

The design and development of blockchain-based applications requires high-level technological expertise. Presently, user-friendly applications are scarce, making their adoption difficult. Their use is limited to those who are technologically skilled, fortifying the digital divide. This may lead to the advent of a techno-elite. In this sense, there are parallels with existing big tech. Therefore, as for current digital technology and similar to artificial intelligence and machine learning, regulatory frameworks will be required to protect users while playing catchup to a fast-advancing technology (Manski 2017).

For the information and communication system, the blockchain might have the potential to eliminate suspicions over content's veracity, yet it will not change people's opinions on other issues; therefore, polarising content will continue to be generated regardless of the platform (Osmundsen et al. 2021). A blockchain-authenticated story might instil more distrust, particularly if the intermediaries controlling the points of origin are also not trusted sources (like many news media outlets or nationalist agents). Harrison and Leopold (2021) posit that "if users do not trust the majority of the contributors recording and verifying the information, we'll be back at square one".

6. Conclusion

The information and communication system driving post-truth behaviour, alt-right populism and the democratic deficit requires immediate reform (Eberl et al. 2021). Efforts in doing so have therefore intensified. The exploration of specific reform mechanisms exist outside the scope of this study, since highly partisan sections of contemporary societies will share problematic information, fake news and different forms of disinformation for deeply engrained reasons (Hochschild 2016; Tandoc et al. 2021). For those described in this study, there is global appetite to regulate digital markets and mitigate reliance on self-regulation (Flew 2021a), media literacy programmes are burgeoning, and fact-checking and debunking initiatives are on the rise (Iosifidis and Nicoli 2021). While each approach is significant, they all have shortcomings.

Blockchain technology offers additional resources in amending the information and communication system. The decentralised, transparent, traceable and immutable nature of blockchain, along with its cryptography concepts, keep content private and secure, while empowering users to gain control of their content. Social media and news media outlets based on blockchain technology can trace news from origin to the present, and in this way, users can identify whether information has been modified and avert misinformation from spreading. Further research on blockchain technology integrated with artificial intelligence has the potential to enable decentralised social media outlets to create more positive impact. Blockchain can offer solutions in a censorship-resistant, decentralised and disintermediated manner. Through cryptography and transaction verification via the network, participants can be given incentives, providing a P2P network that is not controlled by a central authority. Many blockchain enthusiasts support the technology because of its egalitarian worldview, which enables decentralisation of data, cooperation and transparent sharing, ownership awareness, mutual trust and value redistribution.

Nonetheless, we have also underlined the blockchain's technological challenges that researchers are trying to overcome. These include the slow speed of verifications and transactions, high energy costs and the threat of quantum computer attacks. More important are the socio-economic and political concerns that extend beyond looking at any technology in isolation; these are concerns that have already hampered the 'public sphere potential' of current digital systems. Rather than

continuing a course that emancipates societies, as with the events of the Arab Spring, these technologies are now owned by just a handful of highly concentrated, self-regulated digital firms. Despite the blockchain's disintermediating potential, it operates within a system of global capitalism that motivates innovations toward short-term profits rather than public interest initiatives. The sustained platformisation of the Internet implies first reconsidering technological and regulatory measures outside current economic systems to create an information and communications system conducive to a healthy democracy.

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