Do Digital Technologies Have Politics? Imaginaries, Practices and Socio-political Implications of Civic Blockchain

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1. Introduction

Digital technologies have long been a matter of scrutiny and concern to geographers and urban scholars interested in unpacking the social and political stakes involved in the evolving relationship between cities and technology (Ash et al. 2016). Critical geographers have extensively explored the peculiarly urban character of the digital revolution, inviting reflection on the inseparable tie between politics, cities, and networked infrastructures (Kaika and Swyngedouw 2000; Graham and Marvin 2001). Attention has been drawn to the underlying social, political, and economic processes shaping the 'augmented city', where digital information blends with offline spaces (De Cindio and Aurigi 2008). The proliferation of digital technologies across all spheres of urban life has, however, been met with mixed reactions. Geographers have problematized digital technologies on different fronts, particularly because of their material and discursive deployment within existing patterns of accumulation, control, and privatisation of public spaces. In this chapter, we address the purported technical neutrality and the aura of political impartiality surrounding digital technologies (Kitchin 2017; Crawford 2021). This is explored through a theoretical analysis of the blockchain, a distributed digital ledger used for storing, validating, and transferring information. The material functioning of the blockchain, we maintain, is integral to wider socio-spatial endeavours in finance, politics, discourses, material infrastructures, and code (Kitchin and Dodge 2011; Gillespie 2014; Kitchin 2017). Drawing on the seminal work by political scientist Landgon Winner, "Do Artifacts Have Politics?" (1980), we will demonstrate that technological neutrality rarely, if ever, exists.

Use of the blockchain is still dominated by market-oriented applications, but it is also increasingly being used for civic purposes (Elsden et al. 2018; Gloerich et al. 2020). We argue, however, that socially emancipatory and democratising applications of blockchain technology require more than just identifying new users and contexts. For a people-driven, socially orientated civic blockchain to truly work, it is necessary to radically reshape the intrinsic characteristics of technology, which reflect competing ideological visions of our collective futures. We present a preliminary investigation of CommonsHood, an ongoing civic blockchain experiment being developed and tested by the Computer Science Department of the University of Turin. To this end, we critically examine the extent to which such technical solutions can be regarded as co-productive practices open to civic participation, as claimed by the project's advocates. We subsequently propose a research agenda for critically investigating how digital technologies (and blockchain in particular) affect socio-geographical

space and ask who should be responsible for imbuing public values in digital technologies, guaranteeing conditions of fairness, accessibility, democratic control, and accountability.

2. The political values of technologies

In *Do Artifacts Have Politics?* Langdon Winner (1980) makes a convincing case for why we should dismiss technological neutrality as a myth. He problematizes the conventional way of thinking of technologies as passive, neutral tools "that can be used well or poorly, for good, evil or something in between" depending only on human motives and actions. For Winner (1980, p. 121), technologies have intrinsic politics because they can incorporate values, worldviews, and hegemonic and counter-hegemonic aspirations. Departing from both technological determinism and the social determination of technology (see MacKenzie and Wajcman 1985), Winner (1980) emphasises the mutual co-constitution of technology and society and the dynamic unfolding of their relationship within wider geographical contexts. Winner (1980, p. 123) thus proposes what he refers to as a *theory of technological politics*:

> Rather than insist that we immediately reduce everything to the interplay of social forces, [*technological politics*] suggests that we pay attention to the characteristics of technical objects and the meaning of those characteristics. A necessary complement to, rather than a replacement for, theories of the social determination of technology, this perspective identifies certain technologies as political phenomena in their own right.

This means, in other words, that for a fuller understanding of the politics of technology, attention needs to be paid to contextual factors (social, cultural, political, and geographical) as well as the distinctive materialities and technicalities involved in the process. Winner was not alone in claiming that technological artefacts have politics. Sceptical about the common sense notion that technologies are just 'tools' to achieve desired ends, philosophers of science and technology have asserted the non-neutrality of technology on the basis of political (Ihde 1979; 1990; Joerges 1999), moral (Verbeek 2006), and ontological arguments (Haraway 1985, Stiegler 1998; Hayles 1999). Scholars, e.g. from critical theory, postmodern, and feminist perspectives, have recognized the agential power of technologies manifested in their ability to prescribe possibilities for thought and action (Latour 1994; Hayles 1999). At the same time, attention has been called to the political implications of scientific knowledge production and technological development (Haraway 1985; 1988).

In keeping with Winner's (1980) original ideas, recent debates in Science and Technology Studies (STS) have signalled how criteria for choice of design features are neither neutral nor objective (as such principles as efficiency, productivity, and technical improvement are sometimes believed to be), but rather reflect personal judgements, competing rationales, and contending visions of desirable futures (Jasanoff and Kim 2015; Tollon 2022). Inevitably certain interests are prioritised over others; in most cases this follows existing power relations

and privileges (van den Hoven 2005; Klenk 2020). While technologies reflect and operationalize value-laden decisions hard-coded into their design, at the same the political character of technology cannot be reduced to conscious design choices (Bromley 1998), nor to circumstances relating to a technology's declared purposes and immediate uses (see Winner 1977). This is not only because new technologies always produce effects unanticipated by their designers, but also because, as Winner argued (1980), distinct technologies tend towards distinct social arrangements. Thus technologies have the potential to create either centralising or decentralising effects in terms of power agglomeration and political agency.

There are two reasons why Winner's ideas may still be useful more than four decades after their publication. First, by illustrating how politics and technology are inseparable in practice, his work makes clear that a serious commitment to understand technological politics cannot be divorced from an accurate examination of particular technologies and their inextricable connection to broader political issues and power dynamics. Second, Winner takes a critical view of technology but does not simply retreat to a conservative, anti-technology position. The political significance of a technological tool is not limited to its final uses but extends to its conception, design, and development trajectories. This, in turn, leaves space for alternative solutions which adopt fairness and participation as core principles.

3. Questioning the value-neutral character of digital technologies in the city

Scholars have long discussed the non-neutrality of technology and the rhetorical power of scientific objectivity and rationality for legitimising and normalising its impact (Ihde 1979; 1990; Winner 1980; Latour 1984; 1994; Haraway 1985; 1988; Joerges 1999). Some of that thinking precedes the pervasive integration of digital technologies into our everyday spaces and their routine use addressing problems across all domains of public life (see Daston and Galison 2007; Gitelman 2013). In the wake of the 'digital turn' in geography (Ash et al. 2016), the politics of digital technologies have become a key topic of inquiry within urban studies (e.g. De Cindio and Aurigi, 2008; de Wall, 2014). By virtue of their relative spatial compactness, infrastructural and social density, high level of digital connectivity, and cultural diversification (Hall and Pfeiffer 2013; Heynen 2014, Vandecasteele et al. 2019), cities have been notably pioneers in testing and implementing digital media (Certomà et al. 2017; Halpern et al. 2013).

Critical geographical scholarship has examined different aspects of the politics of digital technologies as manifested at the urban scale, drawing attention to the reciprocity between urban policy and technological trends, as well as the complex socio-technical assemblages and uneven digital geographies implicated in their interaction (Graham and Zook 2013; Leszczynski 2015; Certomà 2021). Scholars have increasingly expressed reservations about the smart city, urban big data, algorithmic governance, digital platform monopolies, and test-bed urbanism (Hollands 2008; Greenfield 2013; Halpern et al. 2013, 2017; Morozov 2013; Kitchin 2014; Vanolo 2014; Marvin et al. 2016; White 2016; Sadowski 2021). Alongside

community activists and civic movements (see Townsend 2013), critical geographical voices have highlighted the problematic mobilisation of technological neutrality as an authoritative principle imbricated with market-driven urban agendas. A common source of concern is the way in which digital technologies – networked sensors, ubiquitous communications, big data analytics, predictive algorithms, city dashboards, and so on – are designed and marketed to city governments. Tulumello and Iapaolo (2021, 4) describe this as "the ultimate attempt at deploying technology as ideology". Although commonly presented as evidence-based, value-neutral computational interventions (Crawford 2021), the use of digital technologies to enhance city governance and management has several problematic effects, including (still not limited to):

- the further normalisation of solutionist approaches to urban governance and planning (Morozov 2013; Sadowski and Bendor 2019);
- the alignment of technological development with private goals in directing city development plans (Hollands 2008; Kitchin 2014; Vanolo 2014);
- the corporatization of urban services and the parallel dismantling of welfare programs (Harvey 1989; Swyngedouw 2005)
- the over-securitization of public spaces and related issues of dataveillance (Armao 2013; Hoover 2013; Raley 2013);
- the expansion of policing at the expense of urban policy (Tulumello and Iapaolo 2021)
- the use of proprietary and often opaque (Pasquale 2015) data processing techniques informing relevant decision-making processes, including sensitive policy domains (e.g., policing and public safety).

Automated, algorithmic procedures rely on data which are anything but transparent, neutral and objective. Far from being 'raw' (Bowker and Star, 1999; Gitelman 2013; Crawford 2021), data are always "situated, contingent and relational, framed by the ideas, techniques, technologies, people and contexts that conceive, produce, process, manage, analyse and store them" (Kitchin et al. 2016, p. 23). Here, the problem of algorithmic bias is illustrative of current controversies associated with digital media, whose inner politics amplify "social inequalities under the guise of technical neutrality" (Crawford 2021, p. 131; cf. O'Neil 2016). It is worth noting that the way in which we deploy the term 'digital' is deliberately broad. Following Ash et al. (2016), "there is no monolithic 'the digital', only a variety of differently materialized objects, subjects, spatialities, effects, and affects that arise from varied practices and processes of digital production, circulation, use, and mediation". Underlying our work is the acknowledgement that the digital has been associated with multiple, sometimes conflicting, meanings and investigated through a variety of methods and approaches. As the term digital has, over the years, been indiscriminately applied to different genres of devices, practices, and spaces, this situation has resulted into 'mystified abstractions' (see Striphas 2012), somehow detached from the material reality of technology and its situated uses in cities. Instead of attempting conceptual clarity and completeness, which may indeed be impractical, if not counterproductive, we will therefore further expand the analysis of the

"geographies produced *through*, produced *by*, and *of* the digital" (Ash et al. 2016, 27) by adding empirical specificity.

Despite abundant critiques of capitalist investment in urban digital technologies and their undemocratic uses, much less attention has been paid to local projects and initiatives which adopt a civic-oriented perspective in delivering decentralised and more participatory alternatives (see Townsend 2013). We are thus interested in understanding the potential role that local governments, research groups, activists, civic movements, and professionals with technical expertise may play in reimagining and repurposing digital technologies in more open, inclusive, and participatory ways. In what follows, we examine the deployment of one specific technology, namely, the blockchain, by particularly focusing on the pursuit of alternative technical and political solutions by CommonsHood – a civic blockchain initiative launched in Turin.

4. Case for thinking: civic blockchain app CommonsHood

The blockchain is a digitally distributed, decentralised public ledger shared among the nodes of a computer network, which are responsible for communicating and validating transactions (Catalini and Gans 2019). It enables users to exchange valuable assets over the Internet, be they hard (e.g., physical property) or intangible (e.g votes, patents, information). Unlike traditional databases, which are administered by a centralised entity (e.g., banks, states), blockchain-based transactions occur without the need for a trusted third party (Hawlitschek et al. 2018).[1] Often seen as the next big thing in tech, the blockchain is having a moment, albeit one marked by crucial ambiguities. Advocates see it as an opportunity for supporting a peer-to-peer sharing economy, financial inclusion, non-hierarchical self-organisation, secure accounting and management of resources (Elsden et al. 2018). Detractors maintain that it tends to strengthen rather than challenge the logics of the market through the quantification and commodification of informal human activities and relationships. It has been characterised as business-as-usual disguised as disruptive innovation (cf. Scott 2016).

In recent years there has been a proliferation of urban projects and initiatives experimenting with new ideas, approaches and applications of the blockchain. Nascent uses of the blockchain for social good and citizen empowerment (see Gloerich et al. 2020) frame the development of the blockchain based wallet app *CommonsHood*. Developed by the Computer Science Department of the University of Turin, the project employs co-design approaches with local administrations and citizen grassroot initiatives. CommonsHood has been tested in Turin, a city in north-west Italy, characterised by a long-lasting commitment to grassroots social innovation and civil society activism often supported by both public institutions and public-private partnerships.[2] Openly inspired by principles like social equity, solidarity and

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[1] As each transaction is completed, the related information is shared and available to all nodes (Yli-Huumo et al. 2016).

[2] Amongst institutional programmes for social innovation supported by public-private partnership the following have significant relevance in the city life: Torino Social Impact, Rinascimenti Sociali, Torino City Lab. In

justice, CommonsHood focuses on alternative uses of the blockchain for financial inclusion and collaborative socio-economic models.

Unlike most blockchain initiatives for financial inclusion which are global in scope and ambition,[3] CommonsHood is concerned with the embedded use of technology within urban spaces and communities. It envisions technical solutions tailored to local socio-economic needs. Our example is illustrative of Winner's key ideas about the politics of (digital) technologies, i.e., that there might be multiple alternative solutions for a given social issue and that these might give space for progressive social commitments through the production of the technologies themselves. CommonsHood seeks to "empower local communities and the sustainability of their economies" (Balbo et al. 2020), but how are project's declared principles of equity, solidarity and inclusion translated into the choice and use of different technologies?

CommonsHood leverages the affordances of the blockchain infrastructure for administering, managing, and exchanging resources in a decentralised fashion. Where it differs from Bitcoin and similar currencies is that CommonsHood seeks to expand the scope of the technology beyond the logic of profit, offering alternative financial schemes built upon principles of collaboration, inclusion and solidarity. There are two main kinds of digital tokens which can be traded, stored and transferred using blockchain technology, currency tokens and utility tokens.[4] The main technical difference is that currency tokens have a standalone independent blockchain, while utility tokens operate on top of an existing blockchain system. The distinction is not just technical, but rather defines the affordances of the blockchain for political engagement and intervention. Where currency tokens are traded with the expectation of generating profit, utility tokens are traded in exchange for assets, whether material or immaterial, existing in the real-world.

CommonsHood's recourse to utility tokens is not accidental but can be seen as part of a wider strategy to extend knowledge and use of the blockchain technology beyond the realm of 'technologists' to include the general public. In principle at least, the project allows virtually everyone to issue and manage cryptographic tokens (Balbo et al. 2020). Specifically, CommonsHood provides users (e.g. citizens, local economic actors, civic associations) with a wallet app through which they can intuitively make use of smart contracts. Contract templates are recorded on the blockchain for the automatic execution of an agreement between parties without the involvement of an intermediary. Through the tokenization of assets which may otherwise remain non-tradable, CommonsHood is expected to reduce barriers to capital for the unbanked or underbanked, civic associations, small businesses, and other individuals or groups operating at the margins of the global market. The assumption is that this may, in turn, generate positive impacts on local social and economic dynamics, including: financial inclusion

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consideration of this distinctive trait, Turin has been selected by the European Commission as the home for the forthcoming Center for Social Innovation Competences.

[3] Notably FairCoin, https://fair-coin.org/

[4] The term digital token refers to a special virtual currency token or how cryptocurrencies are denominated. These tokens represent fungible and tradable assets or utilities that reside on their own blockchains.

and the sustainability of the local economy; facilitating funding, cooperation and resource sharing between commons and civic associations; reducing digital divides; and promoting virtuous practices and behaviours (e.g. volunteers for recycling).

In view of its focus on local communities, CommonsHood is integrated with the urban civic social network FirstLife,[5] allowing users to cross reference information about any activity using an interactive map. For instance, a civic association seeking financial support for re-furnishing its rehearsal room can issue cryptographic tokens in the form of crowdsales, rewarding contributors with the right to use the facility for a certain amount of time. This financial scheme is not much different from a traditional crowdfunding campaign, but allows to avoid fees that platforms like Kickstarter[6] require as payment for intermediary services. Also, proponents can gain more visibility by mapping and adding information on the funding campaign on FirstLife.

5. Conclusions

There is an evident political orientation underlying CommonsHood, manifested through a genuine commitment to provide local communities and individuals with an accessible and comprehensible technological tool for organising and sharing resources in a bottom-up fashion. It operates in the spirit of mutual trust and cooperation, rather than competitive individualism and self-interested personal gain. Such an approach constitutes an attempt to envision local alternatives to market-driven financialization, while compensating for the predatory effects of big tech platforms on the local economy. For the moment, however, it remains an open question whether CommonsHood will be effective in contributing to fairer and solidarity-based financial systems.

The project is still recent and certainly promising. Nonetheless, further consideration will have to be given to how CommonsHood contributes to challenging the underlying structural forces shaping exclusion – social and financial. While it is clear that its expected benefits will likely be maximised as more people start trusting and using it, at the same time it is important to consider who it will eventually empower, and who it will leave behind. One immediate criticism is that people who do not have access to a computer, laptop or smartphone or have no internet connection are automatically excluded.

As Scott (2016, p. 11) noted, "[c]ryptocurrencies are subject to all manner of ideological battles, but one thing most interested parties agree on is that the underlying concept of a decentralised public ledger, collectively maintained by a network of participants is very important". This situation is strikingly resonant with Winner's (1980, p. 131) assertion that "[i]f we examine social patterns that comprise the environments of technical systems, we find certain devices and systems almost invariably linked to specific ways of organising power and

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[5] See https://www.firstlife.org/ (last accessed January, 13th 2022).

[6] See https://www.kickstarter.com/ (last accessed January, 14th 2022)

authority", ranging from democratic to authoritarian.[7] The blockchain is by design a decentralised technology, with many definitions emphasising the opportunity if offers for peer-to-peer associations to take place without the need for a centralised and trusted authority. It is regarded by many as a breakthrough technology, with potential societal effects comparable in magnitude to those of the Internet (Braendgaard 2018). In a similar manner to how the Internet has put virtually everyone in the position to create and share content online, the blockchain is now believed to set the conditions for everyone to create and share value in an easy and reliable way. Initiatives like CommonsHood are based upon the expectation that the blockchain will engender radically new forms of individual action and collective organisation.

Blockchain technology is still in its infancy. While its transformative potential appears undeniable, whether it will evolve along democratising or authoritative trajectories is still up for debate. As the political hopes and communitarian ideals of early Internet culture gradually morphed into disappointment over many of the same issues that nowadays the blockchain promises to solve, including the agglomeration of power in the hands of privately-owned platforms, the parallelism suggests caution. The blockchain is generally referred to as a general-purpose technology open to virtually all manner of practical uses and political visions. Albeit partially true, this widespread claim risks obfuscating the fact that there is no monolithic, immutable blockchain – in concept and practice. Rather, the blockchain is akin to a meta-medium enabling the creation of new services and applications which can take multiple forms and properties depending on place and context (Ølnes et al. 2017; cf. DiMaggio et al. 2001).

Our suggestion is that a better strategy for considering both its political significance and its potential may be through focusing on initiatives and applications within specific social environments. This is not to say that the development of the underlying blockchain infrastructure is not in itself a political phenomenon, as Winner would see it. Nonetheless, it is through specific design choices in particular contexts and initiatives that democratic, citizen-empowering configurations of the blockchain become possible. Precisely because technological design has political implications, envisioning truly civic blockchains requires the whole design process to be opened to as great an extent as possible to those who are likely to experience the final products and their impact.

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[7] For Winner, for example, nuclear power and solar energy are renowned examples of respectively centralising and decentralising technologies.

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