

“Governing the urban commons”: DLT, institutions, and citizens in perspective

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Abstract

Borrowing from insights produced in urban planning, media and governance studies thereby leveraging the Ostrom-nian ideas of institutions and polycentricity, this paper examines how to govern commons in the smart city. It offers a reflection upon whether Distributed Ledger Technologies (DLTs) could be a key notion for the commons discourse which centers around stakeholders, self-organization, and a rights-based framework. By decentralizing ledgers and enabling the interoperability of the various interfaces, DLTs make records more accessible, exchanges more transparent, and reduce costs while increasing efficiency, and permit automation, therefore commoning interactions both offline and online are facilitated. We argue that the use of DLTs to preserve the spatiotemporal integrity of key urban spaces is a common value question that needs to be elucidated or renegotiated in order to provide any useful guidance to DLTs integrity-preserving potential. In doing so, we draw attention to DLT-based urban commons and urban governance, and point to inherent incompatibilities that may lead to radical and not-so-smooth changes in urban institutions, while providing a way of thinking which can move the smart city closer towards a values-centered process and away from a preoccupation with technology and efficiency.

Keywords

digital ledger technologies, hybrid space, modes of production, right to the city, commoning, urban commons, hybrid commons, spatiotemporal integrity, common value

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Introduction

The modes of framing and realizing social interaction in cities have been radically transformed by information communication technologies (ICTs) (Miller, 2004; Streitz, 2021). Through ICTs, interactions are no longer restricted by geographic or temporal boundaries, enabling new types of contact and exchange among city dwellers. One such ICT, Distributed Ledger Technologies (DLTs) are said to represent new opportunities for such interactions, which—given the proliferation of research on and practice in urban commoning—opens up an important discussion about social interaction in cities. An urban commons is conventionally thought to be a built or natural resource situated in a city which is “both collectively owned and/or managed by its members or users; and is valued by its members for its everyday use” (Huron, 2017: 963). Communities with a

shared sense of belonging to the space within which their claim to the right to the city is rooted, can engage in commoning (Stavrides, 2016). DLTs introduce a transactionist view on the urban commons, which contrasts with classical interactionist approaches, and has implications for how urban commons may be themselves understood.

A DLT is a peer-to-peer digital technology approach to recording and sharing information across multiple data

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stores, called digital ledgers, allowing for transactions and data to be recorded, shared, and synchronized across a distributed network of participants that are temporally and geographically asynchronous (Natarajan et al., 2017). Blockchain is a specific kind of DLT that uses “cryptographic and algorithmic methods to create and verify a continuously growing, append-only data structure” that serves as the ledger (Nakamoto, 2008; Natarajan et al., 2017: 1). DLTs, such as blockchain, may transform urban commoning by providing a transparent, decentralized, and secure system for tracking ownership and usage rights. For example, they can enable innovation by helping overcome hurdles like information asymmetries, mistrust, red tape, and problems with contracts (Hashimy et al., 2021). They thus increase the viability of Ostrom’s (1990) idea of trust- and reciprocity-based governance of the commons. By decentralizing ledgers, records can be made more accessible, exchanges more transparent, and costs reduced while increasing efficiency, and permitting automation. They therefore are likely to increase faith in exchanges and give participants more confidence, possibly also facilitating new interactions.

DLTs are increasingly being applied in urban governance (Moura et al., 2020; Rot et al., 2020), in ways that highlight their potential uses beyond mere economic exchanges (Davidson et al., 2016; Kane, 2017). Blockchain can serve as the administrative backbone of urban governance projects (Gloerich et al., 2020; Khanna et al., 2021). Furthermore, new ways of working potentiated by blockchain enable public servants to simultaneously raise the accountability, transparency, efficiency, and effectiveness of peer-to-peer cooperation within digital governance (Fariás and Bender, 2010). Applications of DLTs to new areas (e.g. digital identity products) may even lead to the abandonment or obsolescence of previous practices (Henninger and Mashatan, 2021; Nurgazina et al., 2021). DLTs may, arguably, allow cities to “smarten up,” resonating with the increasingly citizen-centric discourse associated with the “smart” city premise which, conceivably, signifies “an evolution of the socio-technical relationship between citizens and cities” (Lee et al., 2020: 116). More specifically, cities are no longer sharply defined spatiotemporal entities, nor does social interaction happen in clearly defined spaces. They are spaces of interaction that become increasingly temporally asynchronous entities and, furthermore, consist of multiple geographical locations, oftentimes distant from each other and increasingly facilitated by various technologies (Miller, 2004; Prainsack, 2019). This in turn has implications for how we govern and relate to urban space (Kitchin and Dodge, 2011; Smajgl and Schweik, 2022; van der Graaf et al., 2021). One meaningful example of this changing paradigm is the commoning of urban space.

Urban commoning is evolving as cities and contiguous spaces, near and far, become “smarter.” This is exemplified in how the City of Bologna define the urban commons as,

“the goods, tangible, intangible and digital, that citizens and the Administration, also through participative and deliberative procedures, recognize to be functional to the individual and collective well-being, activating consequently towards them, under article 118, par. 4, of the Italian Constitution, to share the responsibility with the Administration of their care or regeneration to improve the collective enjoyment” (Art. 2.a) (as quoted in Bartoletti and Faccioli, 2020: 1136). This shift in how commoning is viewed has lent to the notion of urban commons a polycentric governance character. Although polycentricity is not extensively discussed in this text, it is useful to mention that inherent in the current view of commons is the idea that alongside formal and/or centralized modes of governance (e.g. political and market institutions) are self-organizing systems composed of many autonomous units formally independent of one another, choosing to act in ways that consider others, through processes of cooperation, competition, conflict, and conflict resolution. Key implications in our case are that (1) all governance action situations are situated in a complex and nested environment where numerous institutions are simultaneously in play, some of which are compatible, others irreconcilable; (2) this diversity creates an environment of innovation driven contemporaneously by cooperation and competition; and, finally (3) there is no single solution to any governance problem and approaches may be geographically and temporally distributed. Digitalization has emerged as a good fit for polycentricity, and some have suggested that the contemporary realities of polycentric governance call for the simultaneous consideration of online (digital) and offline (cf. urban) commoning (Bollier, 2008).

While these kinds of commoning differ in terms of the resources they involve, they share some key characteristics. Both involve collective action and cooperation and rely on shared governance processes to ensure that the resources are used in a way that benefits everyone. Additionally, both are facilitated by the use of digital technologies, like DLTs (e.g. to provide a transparent and secure system for tracking ownership and usage rights), which are said to have yielded a new ethos,¹ which emerged also in response to the threat posed by the increasing encroachment of private interest in commons spaces (Aho and Duffield, 2020; Bollier, 2008; Cinnamon, 2017; Zuboff, 2015). With this new ethos the digital commons have generated influential new ideas and ideals that have found their way into the discourse on offline commoning, changing how the commons are understood, practiced, and deployed, for example by stimulating peer production of public space (Bradley, 2015). Important among these changes is an increasing politicization of commoning, which enriches Ostrom’s (1990) conceptualization of it as a mode of managing resources beyond markets and governments.

The question of how to govern urban commons, and how to govern with, by, and through DLTs has already been

taken up in the past (e.g. Foster, 2013; Huron, 2017; Poux et al., 2020; Rozas et al., 2021a, 2021b). This paper contributes to this conversation by considering these two domains in tandem. We apply insights borrowed from urban planning, media studies, and public policy while leveraging Ostrom's idea of institutions, those "rules, norms, and strategies" which guide human decision making (Ostrom, 1990), to tackle the question, "How can we govern commons in urban spaces?" To do so the various literatures² that extend Ostrom's institutional design principles (for digital and offline urban commons) were conceptually mapped so that we can begin to develop a set of principles flexible enough to be deployed in this nested environment. We integrate this mapping exercise with literature on DLTs as a governance tool on how it may be deployed to address key collective action challenges (e.g. free riding and over-use) within the context of urban commoning. These are the initial steps in developing a framework where numerous layers of rules, norms, and strategies can operate simultaneously online, offline, through and on DLTs.

In what follows, we begin by describing our approach and then embark on an exploration of whether smartness and commoning can be reconciled before putting commoning and commoning failures into view. We then synthesize the various ideas around institutional design and DLTs before ending with a reflection on whether DLTs could be a key notion for the commons discourse which centers around stakeholders, self-organization, and a rights-based framework.

Examining institutional design at the interface of technological and social innovation

Commoning describes any collective action undertaken by a community in order to govern shared resources (Ostrom, 1990). It is a relational process—guided by social practices and property regimes—which emphasizes the collaborative relationships that are engaged in the co-production and co-consumption of a range of common goods (Helfrich et al., 2009). Commoning is increasingly being leveraged to fill gaps in governance and as a critique to capitalist globalization, the encroachment of the market into public goods and spaces, and rampant deregulation and commodification (Bollier, 2008; Bradley, 2015). Through self-governance, citizens and communities pursue desired outcomes such as greening space with temporarily installed parklets in San Francisco parking lots, urban gardens in Paris (Bradley, 2015), or public safety powered by a local neighborhood watch in Schilderswijk, den Hague (Wagenaar 2007). Urban commons recognizes the legitimacy of social struggles around resources, and places the citizen at the heart of their governance, thereby emphasizing their rights (Helfrich et al., 2009).

Key promises of urban commoning and commons include: the amelioration of the mismatch between the

top-down planning (and design and management) of urban spaces and the actual needs and capacities of its users (Bradley, 2015; Huron, 2017; Linebaugh, 2008; Stavrides, 2016) and, as a result, the cultivation of local social capital for locally relevant and inclusive resilience (Petrescu et al., 2016). This largely bottom-up adaptive governance process that increases social capital and enables communities to develop resilience based on their own capacities, values, meanings, and social-spatial dynamics (Feinberg et al., 2020). Perhaps the most important contribution of urban commons is as a self-governance framework that centers the preservation of urban ecosystems (and their multiple benefits) as integral parts of neighborhoods rather than an afterthought of land use planning (Colding and Barthel, 2013; Mundoli et al., 2017). Urban commons therefore enables and cultivates socio-spatially contextualized resilience amidst overly restrictive and oftentimes irrelevant government plans about urban space and its uses (Feinberg et al., 2020).

In digital commoning monetary exchange is no longer a precondition for transactions, making it possible to imagine a new framework for economic organization that goes beyond the dominant capitalist paradigm (Chatterton, 2016). In contrast to "classical" commons, digital commons bring the idea of self-organization and shared ownership forward into an ecosystem where time and space neither motivate nor limit participation in the commons, enabling a massive amplification in the volume and pace of social interaction. Thus, efforts to "pro-common" social conditions are increasingly aided by digital technologies (Susser and Tonnelat, 2013), which connect to ideas about (truly "smart") urban spaces. Social capital, trust, and even transparency may be promoted through decentralization when members establish dynamics that liberate them from concerns about privacy and data commodification.

However, commoning is no panacea. Failures to establish institutions for the monitoring and enforcement of rules are problems that has long plagued commoning (Coleman and Steed, 2009; Eisenbarth et al., 2021). These challenges may be aggravated given increasing societal fragmentation also under digitalization (Noterman, 2016). Commoning often unfolds in an environment where local governments and moneyed interests have significant decision-making power and resist change (Safransky, 2017; Zielke et al., 2021). Poorly managed commons—particularly those which are prone to congestion—suffer from over-use, erosion, and depletion and may exacerbate inequalities as, "powerful entities can make better use of the resources than those with less power" (Prainsack 2019: 3). Commoning may also give rise to new, potentially harmful power imbalances (Sevilla-Buitrago, 2014), as Anderson and Huron (2021) found in their study of parent teacher organizations in Washington DC and New York City. This calls for the

exploration of new strategies and tools for commoning, like DLTs which can help to advance our understanding of these technologies' potential for improving the management of urban commons, and for promoting more sustainable and equitable cities.

Smart enough to common?

The urban commons are often seen as inherently citizen-centric (Colding et al., 2022; Smets and Volont, 2022). Similarly, one can argue that DLTs are a citizen-centric technology. DLTs can enable greater accountability and transparency in various domains, as they provide a tamper-proof and immutable record of transactions and interactions. This can help to build trust between citizens and organizations, as well as among different stakeholders in the management of common resources. But the main reason for which DLTs are appreciated is their potential for enabling greater citizen participation and ownership in various domains, such as finance, supply chain management, and digital identity. This contrasts sharply with conventional centralized technologies, which may exclude citizen input and participation. However, the use of DLTs alone does not guarantee citizen-centric governance.

Indeed, the governance of DLT is a core concern among its critics and champions alike. Of particular concern is how the communities governing DLTs at present tend to be poorly structured and organized compared to the established organizations that govern conventional digital technologies, therefore citizens may perceive it as risky and unstable (Zachariadis et al., 2019). Additionally, DLTs suffer from technical, social, and economic barriers to their adoption that need to be addressed so that these platforms are truly citizen-centric (Alnahari and Ariaratnam, 2022; Hickert et al., 2022; Radu, 2020). For example, DLTs can be complex and difficult to understand for people who are unfamiliar with the technology, making it difficult to adopt and use the system effectively. Also, implementing DLTs can be expensive, and may require significant investment in infrastructure and training which can be an adoption barrier, particularly for communities with limited resources. Furthermore, while DLTs are decentralized, the infrastructure that supports them is often centralized creating a power imbalance and restricting the participation of smaller communities in the system. Lastly, the energy consumption required to power the decentralized network can be significant, leading to a large carbon footprint that puts off communities that prioritize environmental sustainability (Friedman and Ormiston, 2022). Therefore, design and implementation of DLT-based platforms must take into account the needs and perspectives of diverse groups of citizens, and must be supported by legal and regulatory frameworks that ensure fairness, equity, and accountability.

Despite these concerns, DLTs have been identified as a key enabler for the development of the smart city premise. The latter being a widespread concept, which in the 1980s marked changes in the urban realm related to ICTs and urban systems innovations, and rapidly caught on in the 2000s as a planning and development paradigm for enhancing the quality of life for citizens, improve sustainability, and optimize urban services and infrastructure (Komninos and Mora, 2018; van der Graaf, 2020). Presently, the concept is associated with multifaceted debates and application domains. For example, as a framework, a focus on pragmatic and functional aspects can be detected accompanied by critiques (such as inclusion of vulnerable citizens, privacy) and ambitious solutionist-driven visions (Breuer and Pierson, 2021; van der Graaf et al., 2021). Rather than a spatial vision the smart city concept seems to hold more of a thematic orientation, such as citizen engagement, the environment, and public safety—as such, supporting axes of technology-driven and human-driven, top-down and bottom-up planning, as well as collective intelligence and data-driven intelligence are emphasized in the smart city literature (cf. Hatuka et al., 2018).

In the light of how digitalization has been transforming cityscapes globally, the relationship that the “denizen” has to the city gained new flavor: How people participate as well as why they participate is evolving guided by the new opportunity structures emerging in the smart city (Cammaerts et al., 2014). At the same time, however, in practice citizenship and governance arrive seemingly as an afterthought in the smart city discourse which positions the smart city as something that is pursued for the citizens, but not by them (Moss et al., 2021). For example, all kinds of inferences are being made about participations, affiliations, and predispositions, and so forth, raising among others various ethical issues, such as about surveillance.

Given the tendency to treat citizens as users rather than as equal stakeholders, the call for a change in mindset can be heard whereby instead of seeing “smartening” technologies as the main pathway to a better city, they are seen as a means of supporting a future city which emphasizes values like fairness, tolerance, and wellbeing (Gangadharan and Niklas, 2019). In this way, smart city technologies have been discussed from a rights-based perspective (cf. Cardullo et al., 2019; de Lange and de Waal, 2019; Dulong de Rosnay and Musiani, 2020) and reframed as part of a wider structure to address wicked problems like racism and inequality (cf. “decentering smart cities” in Kitchin, 2022). Therefore, rather than an end goal, “smartening up” exists to reinforce social, economic, and environmental interventions aimed at promoting equity, justice, and openness in the city (Morozov and Bria, 2018). As ideations associated with the concept of smart city have come under critique (Cardullo and Kitchin, 2019; Martin et al., 2018), tied to a larger and overarching conversation about mediatisation and digitalization's societal impact (Esser, 2013),

momentum for more inclusive forms of technology and governance like DLTs and commoning have intensified.

In common(s) we trust

The focus in commoning is on bottom-up self-organization by a group of otherwise independent actors (McGinnis, 2011). Urban resources need not necessarily be managed through commoning; they can also be privatized or regulated by a government (see Ostrom, 1990; Ostrom et al., 1994). However, pure market mechanisms and/or those relying solely on government programs can limit access to these resources by individuals who draw the most benefit from them (e.g. children in green spaces or the elderly in apartment complexes). Therefore, commoning is put forward as an alternative that allows communities to form a new governance relationship with a mutual resource (Feinberg et al., 2020). “Urban citizens” (Harvey, 2012; Huron, 2017) are concerned not only with maintaining and enhancing an urban resource, but also with collaboratively cultivating and sustaining the social conditions—such as trusting relationships—necessary for commoning (McGinnis, 2011; Ostrom, 1990). Public engagement, under this view, aims to improve urban governance by creating public value through collaboration (Bovaird et al., 2015). Thus, commoning places relational processes at the heart of governance, which is why it is increasingly being promoted as a means of empowering those city dwellers who have the greatest reliance on these urban commons.

“Smartening up” by means of DLTs has important implications for commons. At the very least, it may refer to the layering of two or more commoning processes in cities: the urban commons and digital commons. The digital commons exploits the digital transformation to open up the process of knowledge production and knowledge sharing to all, freeing information from the control of corporations. The power of these ideas and values to cross over has been demonstrated in instances where online sharing platforms have strengthened relationships between neighbors or the spillover between online and offline sharing (Vaskelainen and Piscicelli, 2018). Applied in the physical realm, practices like information and resource sharing are changing how city dwellers work, play, and rest, and have implications for how we govern the urban commons. As such, digital commons are seen as promising for urban commons, and open source innovations are increasingly used to plan and develop urban space (de Lange and de Waal, 2019; Petrescu et al., 2016).

Recognizing that the urban commons are governed against the backdrop of the smart society reaffirms the idea that the tendency to reconceptualize the right to the city as a transactionist normative political notion (as a de facto precursor to legal redefinitions that may or may not be pursued by cities) is nowadays located in a digitalized

peer-to-peer context that encourages, accommodates, and facilitates it. A certain bundle of rights is conventionally associated with commons, most of which relate to property and how it can be used by rights holders (Ling et al., 2014). These include rights to access a commons (and to exclude others from it), to extract products from the commons, to participate in their governance, and to transfer rights to others (McGinnis, 2011; Ostrom, 1990, 2010). For example, collective action by migrants to claim their right to access urban space can be understood as an exercise in commoning (Montagna and Grazioli, 2019). By changing the dynamics of how people interact, digital technologies call for a reconsideration of which rights are central for living in the city, and for commoning. For instance, rapid digitization implies that objects which once were not highly commodified, like citizens’ data, gain different types of value which can now be extracted, exchanged, and exploited.

One of the main questions concerning rights is who has them. Citizens claim their “right to the city” when they engage with one another in reshaping space, thereby exercising their right to appropriation (Lefebvre, 1991; Purcell, 2014). Essentially, in line with a commoning ethos, Lefebvre sees citizens as key actors in urban governance (Lefebvre, 1991). The debate around what constitutes the right to the city (Lefebvre, 1991) has been reinvigorated due to the increasingly contested nature of resources, including data and rights. Purcell (2014) focuses on the right of city dwellers to co-create the spaces they inhabit, and to access city spaces. Related to this is the on-going conversation around a more-than-human approach to rights in the city (Cooke et al., 2020; Reese, 2022), which is beginning to extend itself to technologies. Disruptive technologies have long led to the transformation of urban space. New technologies like AI transfer decision-making and urban management responsibilities from humans to machines, giving machines a different kind of agency when it comes to city making (Batty, 2018; Cugurullo, 2020). The discussion about rights emphasizes both the material and ideational facets of the rights to the city. As Lefebvre (1991: 46) writes, “spatial practice, representations of space and representational spaces contribute in different ways to the production of space according to their qualities and attributes, according to the society or mode of production in question, and according to the historical period.” Under this view, the urban places/spaces on which citizens claim their rights are determined by daily practice in these spaces (Schatzki, 2002), how spaces are represented, and the symbolism and imaginaries that are associated with them.

This aligns with commoning, which considers the citizen’s identity as essentially dialogically determined (Hermans, 2001, 2002) and as being dynamic and adaptive, able to respond to signals perceived through their relationships with whom they are capable of cultivating caring

relationships (Singh, 2017). Rights become relevant insofar as they lend meaning to practice, such as the practice of self-governance through commoning, which is a particular expression of rights to the city (Feinberg et al., 2020). Rights are often taken for granted and unquestioned, and the status quo arrangement where citizens vote, governments decide and deliver, and citizens comply or consume prevails. Commoning flips the status quo arrangement on its head. By means of commoning, citizens simultaneously decide, deliver, comply, and consume. They thus test the boundaries of what is deemed as public and private space and in so doing they make a claim on their “right to the city.” As citizens common—that is, as they engage more vigorously with society through self-organization—their relationship with the public sector evolves (cf. co-creation ecosystem in van der Graaf et al., 2021). Commoning belongs to a greater movement of reconceptualizing urban citizenship and the rights and agency of city dwellers (Cardullo et al., 2019; Eizaguirre et al., 2017), and which is sparked by the confluence of two trends—rapid urbanization and intensifying digitalization. For all of its promise, commoning remains a niche practice in the city. It is rare and significantly underused compared to other modes of governing urban commons such as privatization and regulation. This is due in part to the many difficulties that have been associated with commoning, more generally, and the urban commons, in particular.

Trouble in paradise? the urban commons, a tragedy in three parts

The benefits that have been attributed to commons are manifold. Aside from providing a way to govern a mutual resource sustainability, commoning may provide livelihood, health benefits, recreation, individual and community resilience, a collective identity, social capital, cultural evolution, a chance to express values such as solidarity, belonging, mutual care, and respect, and generate economic value (Arora, 2015; Borch and Kornberger, 2015; Derkzen et al., 2017; Feinberg et al., 2020). However, commoning can fail, with consequences not just for the common resource, which risks depletion and degradation, but also for the communities that rely on these commons (Anderson and Huron, 2021; Zielke et al., 2021). With this in mind, in what follows, we provide a brief review of the key problems found in commons.

The tragedy of the commons

The literature on common pool resources (CPRs) contains multiple examples of governance failures from commoning. Poorly designed and implemented governance institutions—as well as poorly designed physical spaces—give rise to problematic behaviors such as free-riding or over-

harvesting which contribute to resource degradation or over-exploitation (see, for example, Foster, 2013; Nagendra and Ostrom, 2012). These tendencies can lead to the collapse scenario foretold by Hardin (1968) in his article, “The Tragedy of the Commons.” Hardin argues that if left to their own devices, people will misuse or abuse CPRs, leading to their depletion. The implication of this argument is that commons therefore need to be heavily regulated through state or market mechanisms.

Hardin’s work has been highly influential, and its application has been disastrous for communities with longstanding relationships to CPRs, like the indigenous communities. Studies have subsequently shown that governments and markets often allocate resources poorly compared to self-governance. Ostrom (1990, 2010) however argued that non-institutionalized and informal management of the commons can well lead to their sustainability, in the presence of well-designed institutions (Ostrom, 1990). Ostrom defines institutions as “the shared concepts used by humans in repetitive situations organized by rules, norms, and strategies” (Ostrom, 2010: 23). Institutions are socially constructed and specify what choices are possible, and what their possible consequences are. Her institutional design principles specify the conditions under which governing can be adequately governed. However, it has been noted that these principles may not be sufficient for effective governance in urban settings (Borch and Kornberger, 2015; Foster and Iaione, 2019; Stern, 2011).

The remake: the tragedy of the urban commons

The city is a context that is markedly different from CPRs like forests and wetlands (Stern, 2011). In the city, static designs and technocratic mindsets can slow down, if not obstruct bottom-up initiatives (Chatterton, 2016; Ling et al., 2014). Governments can also hinder commoning through overregulation (Feliciano, 2017) or by co-opting citizen action (Cooke et al., 2020). The diversity of participants in urban and digital commoning requires expectations and emotions to be managed, and if commoning is poorly moderated competitive and conflictual dynamics among participants may arise (Kondratieva et al., 2022). This can lead to exclusionary practices in cities where the rights of some city dwellers come up against the property rights of others (Colding and Barthel, 2013; Esser, 2013), leading some to feel overshadowed or neglected. The literature often relies on the unspoken assumption that “things will work out well” when commoning processes are initiated (Bartoletti and Faccioli, 2020; Bovaird et al., 2015). This is however a rather naive assumption—especially concerning social sustainability—that comes too close to the “invisible hand” of neoclassical economics. Decentralization, while offering a lot of flexibility, has the drawback of generating leadership vacuums, which can double the work of managing commoning processes

(Elkin-Koren and Salzberger, 2004). De Yong (2012) and Tan and Neo (2009) discuss examples of territorialization, whereas there are at least two incidents of serious violence in Finnish housing cooperatives in the cities of Turku and Espoo. A related issue is scale, as commoning is shown to be more effective for small groups, but rapidly densifying urban spaces is a challenge for setting up small, cohesive communities.

Both scale and diversity are closely related to yet another commoning challenge: trust (Feinberg et al., 2020). Trust is difficult to establish a priori in urban settings. In this regard urban commons are similar to the so called “new commons” to the extent that it is engaged in by strangers (Huron, 2017), and governance in this sense becomes a means of managing value creation as opposed to the conservation of shared resources. In order to work together in a functioning collective, denizens who engage in “commoning” must be able to establish a shared identity and overcome mistrust (Rozas et al., 2021a).

The sequel: the tragic comedy of the urban commons

At the interface of urbanization and digitalization, commoning can be further complicated. For example, digital platforms are praised for bringing new people into the fold of urban governance and for providing a space for knowledge sharing and learning (Bartoletti and Faccioli, 2020; J alas et al., 2017). However, these open forums face the problem of congestion. Overcrowding divides attention and can lead to more superficial interactions between commoners (Rao, 2013). Additionally, access to IT resources is not evenly distributed in society which means that some people are excluded from important decision-making fora. Moreover, the architecture of digital technologies may themselves constitute important challenges for commoning. When it comes to decentralized systems, anachronistic legal frameworks, unsuitable technical architectures, the polluting impacts of digitalization all contribute to making online commoning challenging and unsustainable (Dulong de Rosnay and Musiani, 2020; Elkin-Koren and Salzberger, 2004).

Institutional design for the digital urban commons: DLTs to the rescue?

After repeatedly observing patterns in successfully governed CPRs, Ostrom specified design principles for successful commoning (Ostrom, 2010). To paraphrase Harold Lasswell, the first four principles are about, “who gets what, where, when, and why?” Decisions about how rights, resources, and responsibilities are distributed must align with a community’s ideas about what is fair (appropriation and provision rules) and what is doable (congruent with local conditions). As has been previously noted by

Prainsack (2019), these design principles can only be carried out when it is possible to exclude others by drawing boundaries around a resource, something which is difficult to achieve given how urban and digital resources are spread over space and time (Miller, 2004). The fifth rule speaks to joint ownership of commoning, which occurs through co-creation and co-production. Attributes of the urban commons resource should drive how these choices are made. As Blomquist and co-authors write, Ostrom’s work “encourages us to remember to ask [...], What are people really dealing with here? What are the attributes of the goods or services they are trying to produce or consume or distribute, or the resources they are trying to use or share?” (Blomquist and deLeon, 2011: 2).

When it comes to urban commons, Foster and Iaione (2019) modify and extend Ostrom’s original design principles by explicitly acknowledging the role of the state and technology in commons governance. Regarding the former, governing urban commons rely on cooperation with the actual “owners” of public spaces: the government. The policies adopted by the state and its willingness to engage in co-creation can either enable commoning or stand in its way. Thus, communities may try to collaborate with the state. In terms of Technology Justice, media and communications technologies can support commoning experiments in many ways (Teli et al., 2015). Crowdsourcing has, for example, opened possibilities to citizens seeking new governance solutions for the social and environmental concerns (Certomà et al., 2015). Hackathons also present an opportunity for involving citizens in the co-creation of public service design and development (Concilio et al., 2017). These digital solutions are part of a mix of online and offline interactions that can encourage and support commoning.

In the remaining four design principles, Ostrom focuses on how institutions should be enforced in a commons. In particular, she emphasizes the need to monitor behavior and to punish those who violate institutions. These requirements are more difficult to meet in urban commons, given their scale. DLTs may be an instrument which primarily supports these last four design principles. DLTs can help increase transparency, accountability, and the trading of different resources (including rights), and co-creation of shared values. For example, improving citizen engagement in public decision-making, service improvement, and social impact initiatives, DLTs can facilitate the accountability of aid, financial inclusion, civic innovation, and personal data management.

Compared to conventional commons, the urban commons are characterized by relatively weak trust (Huron, 2017). The influx of new (and perhaps unfamiliar) people into urban commons—many of them transient—makes repeated interactions less likely, while increasing the difficulty in monitoring behavior and sanctioning rule breakers. Thus, trust is harder to cultivate. In a system built upon the backbone

offered by DLTs, familiarity and trust no longer are prerequisites to commoning, allowing a neighborhood's newcomers—for example a migrant family—new ideas and viewpoints which enrich and improve how people common and govern communing (Poux et al., 2020). By increasing transparency and verifiability of interactions DLTs can function as “trustless systems” (Werbach, 2018), which in turn facilitates collective action. Trustless systems do away with the need for third party intermediaries and in so doing, can be a technology which intermediates between relationships which are prone to conflict and disagreement (e.g. government-citizens, old timers-newcomers). In this way, urban commons are no longer hampered by weak trust and can even become sites where trust can be cultivated through the establishment of a commons (Feinberg et al., 2023).

In the past, banks and other financial institutions were needed for significant financial exchanges. Through tokenization “value” can be transferred between parties. Monetary value is not the only thing that can be exchanged as tokens (Huckle and White, 2016), and the nature of exchanges are also shaped by the norms and values which drive the communities making use of the blockchain. This pushes the urban theory and planning theory towards a rather critical discourse surrounding core values of what kind of entity a city should be: issues of identity (collective and individually), self-determination, and rights to the city become essential. Blockchain reduces bureaucratic hurdles, enable transactions and reduce the need for centralized oversight mechanism through automation, and enable transparency and accountability (Gloerich et al., 2020; Rozas et al., 2021a, 2021b).

Much like a blockchain ensures that a system of values and exchanges is secured against individual acts of alteration, it can also safeguard vital public spaces. Blockchain-based DLTs reduce transaction costs (Kondrateva et al., 2022). Smart contracts—small sections of code which can be inserted into a blockchain have the benefit of being automatically executed, which reduces monitoring and oversight costs. Additionally, smart contracts which leverage cooperation and mutual agreements for their modification (Goldenfein and Leiter, 2018) help geographically and temporally dispersed actors to build trusting relationships. Blockchain thus disciplines the openness and congestion of online platforms by offering a new architecture within which multi-party interactions through smart contracts is possible, self-organizing, and manageable (Hassan and De Filippi, 2021).

As is often the case, new problems replace the old. While DLTs may play a facilitative role for commoning, their impacts on space can be limited by constraints encoded into a blockchain. Moreover, while DLTs literally put the power over data in the hands of the people, the absence of a central administrator also leaves a void: No one is responsible for failures or mistakes (Walch, 2016). Moreover, the DLT relies heavily on volunteers when

urgent action is needed and lacks mechanisms other than simple majority mechanisms for reaching consensus (Azouvi et al. 2018). DLTs are governed by their own institutions and their use as a governance mechanism within the context of urban commons is situated within a nested system of polycentric institutions. In such a nested system, classic collective action problems may be present—and perhaps even amplified—when DLT institutions (already a multi-layered system itself) overlay urban commons.

DLTs are not rules. Rather, they facilitate the enforcement of rules, while themselves being guided by rules both on chain and off chain (Poux et al., 2020). Technical rules which are encoded into the blockchain are called on-chain rules and are put into force by the network's infrastructure itself. Instead, off chain rules are designed, decided, and enforced by the blockchain community to steer interactions on and through the chain, and therefore they govern the infrastructure itself (e.g. enabling supply chain and reverse supply chain traceability and ownership transfers in secondary markets underpinning the circular economy).

Sometimes, the combination of off-chain and on-chain rules falls short of a well-designed commons governance system (Howell et al., 2019). For example, in using blockchain communities may face a tradeoff between transparency, accountability, and facilitated exchanges on the one hand, and privacy and control over governance processes, on the other (Cila et al., 2020). This is why some actors call for placing particular attention to the rules in play (Ostrom et al., 1994) when deploying DLTs within the context of commoning.

On chain rules must be sufficiently specific in order for the machines to understand and use them. Rules, in this sense, must not only be specific, but must also be encoded and formalized. The implication is that on-chain rules are characterized by some inflexibility (Hassan and De Filippi, 2021) which may be incompatible with commoning. Another concern is the fact that not everyone has the ability to translate rules into code (Rozas et al., 2021a, 2021b). Therefore, there are times when DLTs may reinforce inequalities and promote dynamics which are counterproductive to commoning. Even when DLTs only encode pro-social rules, it is important to remember that they are limited to the digital world, and still require workable pro-social rules to be established and enforced in the material world.

Discussion and conclusion

DLTs can represent a re-invention of spaces of flows and interactions in cities (cf. Batty and Cheshire, 2011). Traditionally, this has been an architectural analysis question (Hillier and Hanson, 1984), where the design of a neighborhood embeds societal norms on social solidarity:

how people come together or get segregated, how and where they interact, and how dwellers and transient visitors alike avoid, meet, as well as control or police each other. What is interesting with DLTs is that they establish a virtual space, or hyperspace, which involves much the same physical and social components (or representations of them), therefore providing a new way to think about flows and interactions. DLTs enable the interoperability of the various interfaces in use by different parties. And it is exactly those norms of socio-spatial interaction that are important for urban commons and urban commoning processes, which grant DLTs the potential as a key notion for the commons discourse.

Lefebvre's production of urban space is a decentralized, and asymmetric mechanism. Since any patch of urban space is fundamentally an artifact—a bit of urban information—the plurality and dynamic nature of the production process regularly results in the fragmentation, corruption, and degradation of this artifact. A vivid example is the effect that the manifold of actors, interests, planning processes, political agendas have on, for instance, the evolution of green public space: they lead to its eventual extinction or irreversible loss of quality and original function, even though its value is recognized at any given point in time. From this perspective, perhaps the most advanced use of DLTs is their role in transforming physical spatial planning and urban design (concerning the design and management of concrete physical objects of neighborhoods) into a commons-based activity. Blockchain technology preserves the integrity of an evolving body of information through various accountability safeguards. Tampering attempts lead to the loss of valuable information, which serves as a safeguard. Much like for immaterial artifacts, we can imagine that similar accountability and safeguard tools could be applied to the spatial planning, design, and management processes, aiming at preserving the integrity of physical artifacts. The use of DLTs to preserve the spatiotemporal integrity of key urban spaces is a common value question—they need to be elucidated or renegotiated in order to provide any useful guidance to DLTs integrity-preserving potential.

Considering the nature of cities as objects of governance, the promise of DLT-based urban commons has a number of important implications. For quite a few centuries, cities have been seen as an institutionalized form of regulating the activities and resources of urban dwellers (Foucault, 2009). The planning profession, belonging to this context, evolved into a profession with guiding principles that are highly institutionalized, formal, territorial, and revolving around notions of hierarchy and control. In Castoriadis' (1998) terms, the social imaginary, that ultimate truth upon which the institution of urbanity was founded, is too far from (a) what DLT-based urban commons represent and (b) in a decentralized socio-spatial context. This, of course, suggests that DLT-based urban commons imply the important question: do they require from urban

governance something that was never the intention? As this form of bottom-up governance is nevertheless under way as a result of multiple streams of decentralization, and fragmentation of social processes in urban space, we suggest that these inherent incompatibilities eventually necessitate a more fundamental reconceptualization of urban institutions.

Finally, changes in the underlying strata of social imaginaries relate quite well to the fact that both commons-based and DLT-based modes of governance challenge formalized and institutionalized guiding principles such as justice. There are growing concerns in planning theory about the over-representation of notions of justice and equity in planning as opposed to more fundamental notions such as kindness (Forester, 2021) and dignity (Davy, 2020). These are indeed notions outside formalized institutions of urban governance and DLT-based urban commons could also represent one possible path towards instilling such humanist values back into the production and meaning of urban space. In fact, Cila et al. (2020) note that DLT-based commons can accommodate in an agile and dynamic manner the expression of values as created by the community, which, following Tanenbaum (2014), makes room for a discussion on fundamental issues of ethics, values, and social stances. For instance, Inwood and Zappavigna (2021) report a prevalence of more fundamental, non-institutionalized shared values in blockchain initiatives, which in their case was expressed via trust to individuals as opposed to institutions.

It is possible that insights offered from the burgeoning literature on urban commons provides a way of thinking which can move the smart city closer towards a values-centered process and away from a preoccupation with technology and efficiency. On the flipside, the rich conversation around rights-based urban systems taking place among smart city scholars has massive potential to inform studies of urban commons.




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Notes

1. As manifested for example such things as the “hacker ethics” e.g. https://wiki.p2pfoundation.net/Hacker_Ethic#Book:_The_Hacker_Ethic.
2. Literature was selected for inclusion using four key word searches on web of science and scholar which were further screened by reading abstracts. Only literature relevant to this paper’s aims were included.

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