

Urban Data Power: Capitalism, Governance, Ethics, and Justice

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Introduction

Data have long been an important means for understanding and managing cities. During the Enlightenment and the establishment of modernity, scientific advances and the growth of bureaucracy significantly expanded the role of data for monitoring and regulating populations and their activities (Desrosières, 1998). States widened the systematic recording of data, such as registering personal information, conducting surveys and censuses, and tracking administrative services such as taxation, welfare, education, and health (Koopman, 2019). Data became a key source of evidence for social policy and the functioning of economies. The growth of double-entry bookkeeping and new accounting practices drove data practices within companies (Porter, 1995), later accompanied by business intelligence services (Gross and Solymossy, 2016), with data themselves becoming a tradable commodity (Sylla, 2002). In all these cases, the data produced and their associated infrastructures and practices were the product of data politics and were used to exercise data power. That is, data were produced and utilized to achieve particular aims and objectives for the interests of selected constituencies.

In the digital era, the importance of data as a resource and commodity has multiplied. This is particularly the case over the past two decades, given mass datafication and the rapid growth of big data, and their increasingly central role in the administration and operations of the state and business. Datafication is the process whereby more and more aspects of everyday life are captured as data, primarily through their digital mediation (van Dijck, 2014). Big data are produced continually and are exhaustive to a system; that

is, the data are not sampled but are generated in real time for every individual, object, and transaction within a domain (for example, an automatic number plate recognition system tracks every single vehicle, not a sample of them) (Kitchin, 2022). Big data are essential elements of most smart city systems (for instance, integrated control rooms, coordinated emergency management systems, intelligent transport systems, smart energy grids, smart lighting and parking, sensor networks, building management systems) and urban platforms (such as Uber or Airbnb) (Kitchin, 2014). They are increasingly being used in performance management systems in order to monitor and direct city service delivery in a timely manner, and for city benchmarking and policy making (Kitchin et al, 2015). Financial big data and algorithmic systems are pivotal to the practices of fast and speculative urbanism, in which urban development is accelerated and intensified through the rapid circulation of data and capital (Datta, 2017).

Urban big data have become essential for how cities are planned and managed, how services are operated, and how business takes place within and between locales. Big data systems exert significant data power; that is, they possess the capacity to influence and transform social and economic relations and activities (Ruppert et al, 2017). In other words, they determine the outcomes of decision-making and action, with differential effects: working for the benefit of some (usually those that own or run systems) at the expense of others. Data power is used to maintain control or extract profit, or to socially sort people along the lines of race, ethnicity, gender, class, sexuality, disability, and other social markers (Browne, 2015; Eubanks, 2018). For example, data in administrative systems determine the services and benefits citizens receive, and how they are governed, based on their characteristics and activities (Kitchin, 2022). Data within predictive policing systems, or within housing investment applications, direct which areas and populations are targeted for attention (Jefferson, 2018; Safransky, 2020). Data within locative media and urban platforms shape the information and offers shared with users, and seek to influence and nudge their behaviour (Barns, 2020). These systems are saturated in data politics relating to the contested ways in which data are produced and used, whose interests they serve, and how data power is challenged and resisted. Such data politics is reflected in the varying points of view, agendas, rationalities, ideologies, and negotiations associated with data-driven systems and the work they perform.

This chapter is centrally concerned with the data power and data politics of urban big data systems. It argues that urban data power is principally (re)produced to deepen the interests of states and their ability to manage urban life, and companies and their capacity to create and capture new markets and accumulate profit. In other words, it is deeply imbricated into the workings and reproduction of political economies, its deployment justified as a necessary means to tackle various urban crises and sustain

growth. Indeed, a set of persuasive discursive regimes have been constructed regarding the deployment of big data systems that promote and make their logic and application seem like common sense and the preferable way to try to solve urban problems (Kitchin, 2022). For example, the data power exerted through smart city technologies is justified as necessary to tackle three significant challenges: widespread changes in patterns of population, particularly rural to urban migration, and subsequent resource pressures; global climate change and the need to produce more resilient cities; and fiscal austerity and the desire to create leaner governments and attract mobile capital (White, 2016). Smart city technologies, it is argued, will enhance productivity, competitiveness, efficiency, effectiveness, utility, value, sustainability, resilience, safety, and security through the harnessing of computationally produced data power. The next section details how data power is being claimed and exerted through the logics and practices of data capitalism, particularly with respect to urban platforms. This is followed by a discussion of how data-driven systems are shifting the nature of governmentality and governance, enacting new, stronger forms of data power, as well as transferring some aspects of municipal government and service delivery to companies. The chapter then considers how data power is being resisted and reconfigured through an engagement with the ideas of data ethics, data justice, data sovereignty, and the practices of data activism.

Data capitalism and the city

The relationship between capitalism and urban development has long been theorized. As Brenner et al (2012, 3) contend, cities ‘are sculpted and continually reorganized in order to enhance the profit-making capacities of capital’ since they are ‘major basing points for the production, circulation, and consumption of commodities,’ as well as themselves being intensely commodified. Capitalism prioritizes exchange-value (generating profit) over use-value (the satisfaction of basic needs) and operates largely for the benefit of a relatively small group of elite actors who own and control the means of production (Harvey, 1985). The use of digital infrastructures, systems, and platforms, in the guise of producing a smart city, is the latest attempt by capitalism to leverage the city as an accumulation strategy, with companies seeking to capture and sweat, or disrupt and replace, public assets and services through technology solutions, support local economic development and attract foreign direct investment, drive real-estate investment, and foster a neoliberal, market-orientated approach to urban governance (Hollands, 2008; Shelton et al, 2015). A key element of this accumulation strategy is the data power enabled by the logics and practices of data capitalism.

Data capitalism is a form of capitalism wherein value and profit are driven in the main, or in large part, by extracting value from data, and data are

themselves a form of capital and are key assets for speculative investment, not simply a commodity that can be converted into monetary value (Sadowski, 2019). The imperative for data capitalism is to generate, circulate, and monetize data. Mass datafication and the rollout of data-driven systems are a means of capturing and monetizing activities that have to date been weakly commodified and leveraging additional value from those already in the fold of capitalism. This is the prime reason that companies are supporters of the open data agenda: not to facilitate transparency and participation, but to gain free access to a resource that can be transformed into a product (Bates, 2012). To maximize profit, data capitalism seeks to obtain data for minimum cost and extract as much value as possible. In many cases, the data are generated without remuneration for labour, with the subjects and producers of data passively participating or knowingly creating data for free as an inherent feature of the system or platform (by being present and performing an activity, or by clicking, swiping, typing, uploading) (Sadowski, 2019). Communal resources, such as social communication or a public street, are enclosed through digital mediation, and personal activity and information datafied.

For some, this process of accumulation through data dispossession can be understood as forms of modern-day colonialism, in which the extraction of data, and through it the further colonization of daily life by capitalist interests, works in similar ways to historical, imperialist appropriation of territory and resources (Thatcher et al, 2016; Couldry and Mejias, 2019). Within data colonialism, data power is highly asymmetrical, with a system or platform owner controlling its operation, and challenging exploitative practices is difficult given their configuration and management (West, 2019). For example, on a locative media platform such as Foursquare there is a marked division between those who control the means of production and those who must submit to data extraction to gain access to service, the latter of whom are simultaneously a consumer (user), producer (labourer), product (data), and target (of value extraction, for example, to be sorted, judged, and nudged). While it might seem that some services are free for consumers to use, a price is being paid, dictated on the terms and services of companies.

Urban platforms are profoundly data-driven and derive their revenue from data monetization (usually by producing advertising revenue or selling data on to third parties), along with taking a fee for any goods or services sold via the platform and attracting venture capital. Data that are sold are often purchased by data brokers who consolidate multiple streams of data, repackage them into new products, and offer data services, such as microtargeted advertising, demographic profiling of individuals and places, assessing creditworthiness and risk, and business and bespoke data analytics (Roderick, 2014). These products and services can have a profound effect on cities by shaping decision-making and investments, in turn reinforcing and deepening social and spatial divides. This is particularly evident with

respect to housing and the use of various forms of big data in making decisions relating to credit, tenancy, speculation, evictions, (dis)investment, and transfer of use (such as to short-term lets) (Safransky, 2020; McElroy and Vergerio, 2022).

This social and spatial sorting results in those that are already marginalized in society experiencing a double form of data colonialism (Mann and Daly, 2019). As well as experiencing new forms of data power, data colonialism amplifies historical forms of colonization and practices of social and economic exclusion (Ricaurte, 2019). This is particularly evident with respect to race, where people of colour are subjected to new algorithmic forms of violence, which build on and extend traditional forms of structural violence (Benjamin, 2019). For example, predictive policing seeks to anticipate and prevent future crime by analysing a range of data, such as the location and perpetrators of recently committed crimes, along with a range of longitudinal data relating to crime patterns and local intelligence, to guide patrol routes and target potential suspects (Shapiro, 2020). The algorithms used have been trained using historical records of crime, yet these data contain systemic bias given that black people are more likely to have been stopped and searched, arrested, and incarcerated (Brayne, 2017). Older forms of bias and violence are encoded into new forms of structural violence, further targeting black people, recreating a self-fulfilling cycle, and perpetuating institutional racism (Jefferson, 2018; Moses and Chan, 2018). Smart city technologies produce what Benjamin (2019) terms a ‘new Jim Code’, an algorithmic version of the Jim Crow laws that enforced segregation. Rather than tackling crises of urban poverty, discrimination, and segregation, they help deepen them.

Service-orientated, data-driven smart city technologies typically generate revenue through service contracts with state bodies, and creating and selling derived data products. Along with accessing open data, these technologies enable capital to colonize state data, enclosing them within their data infrastructures, where they are transformed and value added to produce new services, the primary market for which is often the same state bodies from which they were extracted (Bates, 2012). At the same time, the delivery of public services becomes ever more orientated around the production and consumption of data, and the role of data intermediaries becomes normalized. The most recent corporate innovation to enact data capitalism is for companies to try to capture the role of the state, moving beyond supplying services to, or acting on behalf of, the state to become state-like and sovereign, owning and governing settlements (Sadowski, 2022). In effect, the state is transformed into a privately owned state-as-a-platform in which a company constructs and controls all aspects of a locale including territory, buildings, infrastructure, service delivery, and governance (Sadowski, 2022). These ambitions do not relate solely to utopian, separate, autonomous enclaves, campuses or company towns, but ordinary neighbourhoods in cities.

The most documented attempt to create such a state-as-a-platform neighbourhood is Quayside in Toronto, a waterfront development that was to be delivered by Sidewalk Labs, a subsidiary of Alphabet, Google's parent company (Hodson and McMeekin, 2021; Sadowski, 2022). Announced in October 2017 and abandoned in May 2020, it aimed to create 3.3 million square feet of residential, office, and commercial space on a site of 12 acres, with ambitions to scale to a further 800 acres of adjacent land (Moore, 2019). It promised to be a neighbourhood built from the internet up, using a suite of smart city technologies to run a data-driven city. Significantly, Sidewalk Labs proposed to manage service delivery, which would all be private (for example, charter rather than public schools), take on governance functions, shape local and city policy, self-regulate their endeavours, and levy taxes (Mann et al, 2020; Tenney et al, 2020; Hodson and McMeekin, 2021). Similarly, some of the fast urbanization and smart developments in Africa seek administrative autonomy and an 'extra-territorial status that enables property owners to assume the bureaucratic responsibilities and regulatory functions once reserved for exclusive control by municipal authorities' (Herbert and Murray, 2015, 475). In other words, the neighbourhood developments are privately owned and administered, with little to no state involvement in local services and infrastructure provision and governance, with data-driven systems being key to their operation. Clearly, such arrangements wield enormous data power that is largely out of reach of democratic politics.

Digital governance, governmentality, and the city

As the Toronto example highlights, data-driven digital systems, infrastructures, and platforms are having a profound effect on urban governance and governmentality. This is occurring in two interrelated ways. First, and dovetailing with the rise of data capitalism, is the deepening of the neoliberal agenda and the extension of the role of industry in working with or on behalf of states to deliver essential city services. Technology companies have been actively targeting municipal governments for business contending that their products and services can more effectively and efficiently solve urban issues and undertake the work traditionally performed by the state (Söderström et al, 2014; Sadowski and Bendor, 2019). A key element of their argument is that the public sector lacks the core skills, knowledge, and capacities to address pressing contemporary social issues and maintain critical services and infrastructures, which can only be provided by specialist enterprises, market-led innovation, and technically mediated solutions (Kitchin et al, 2017). As such, state-led universal provision needs to be replaced by services delivered through a competitive marketplace, enabled through deregulation, public-private partnerships, outsourcing, and privatization (Brenner et al,

2010). Further, the state is encouraged to support and promote this transition through policy, market subsidies, and investment.

This neoliberal agenda drives government into the embrace of data capitalism, creating new long-term markets for capital accumulation. Importantly, neoliberalism also recasts urban citizenship. Rather than citizenship being grounded in inalienable rights and the common good, it is orientated towards market principles, with citizens reframed as consumers who have freedom of choice, but also responsibilities and obligations to act as states and markets dictate (Brown, 2016). Individuals are expected to navigate and negotiate the provision of services based on personal, social, political, and economic capital, framed within constraints that seek to limit excessive discrimination and exploitation (Brown, 2016). Citizens in the smart city can thus freely select services as long as they can afford them and they comply with state laws and corporate terms and conditions (Cardullo and Kitchin, 2019).

Second, new data-driven algorithmic forms of urban governance are being introduced. On the one hand, these systems are being used to make municipalities more business-like in their operation, utilizing new data streams to implement performance management systems designed to monitor workers and service delivery, and control and regulate infrastructure, in order to improve the efficiency and productivity of government. In effect, government is adopting the logics and practices of business intelligence to guide organizational and operational concerns, utilizing instrumental techniques such as tracking indicators, dashboards, and benchmarking (Kitchin et al, 2015). On the other hand, smart systems are being used to manage and regulate populations in more technocratic, instrumental, and automated ways, and often in real time. The digital mediation of services, utilities, policing, and security using big data systems is enabling five significant interrelated transitions in how society is governed.

First, smart city technologies significantly increase the scale and scope of surveillance regimes within public and private space. The transition from analogue to digital, and from visual to multi-sensor capture enables a variety of data to be monitored in real time using new, more sophisticated means of identifying, monitoring, storing, and acting on data streams, including facial recognition technology. A good example of this transition is with respect to policing, with forces in the US installing new command-and-control centres which employ extensive multi-instrumented surveillance (such as high definition CCTV, shot-spotter sensors, drone cameras, bodycams, online community reporting, as well as scanning communications and social media) to influence social behaviour and direct on-the-ground policing (Brayne, 2017; Wiig, 2018). Second, digital technologies and systems increasingly capture users within their rule-set and operations. These operations dictate pathways and actions, with failure to comply blocking progress. For

example, an online welfare portal only permits certain ways of navigating and responding to complete a process. The entire interaction can be continuously recorded and is reactive to an individual's behaviour, but outside their control (Cohen, 2013). Third, digital systems permit the algorithmic processing and analysis of data; they are able to sort, sift, analyse, and act on streams of data in a systematic, consistent manner. Proponents argue that this algorithmic approach produces an objective, neutral assessment based on the data only, removing human bias from decision-making. Fourth, due to their computational competencies, the systems can operate in automated, autonomous, and automatic ways, enabling data to be processed and acted upon in real time (Kitchin and Dodge, 2011). This greatly increases the extent of monitoring and control as the systems can continuously perform governance functions. Lastly, streams of big data and advanced data analytics allow predictive profiling and anticipatory forms of governance across a number of domains; that is, to anticipate what is likely to happen under different conditions and for different populations and to act in a pre-emptive manner (Shapiro, 2020). Predictive policing enacts anticipatory governance, seeking to proactively prevent crime from taking place, and its logics are increasingly being applied to welfare assessments, security screening, and emergency management (Eubanks, 2018).

These five features of digitally mediated governance are reshaping governmentality; that is, the logics, rationalities, and techniques that render societies governable and enable governance, as well as extending the extent to which individual behaviour is guided and determined by companies and their technologies. Until relatively recently, the dominant mode of governmentality was disciplinary in nature (Foucault, 1991) in which technologies monitor individual behaviour from an external vantage point, with the possibility of being caught transgressing social expectations and laws leading to a self-regulation of action. Despite the procedures and technologies put in place, monitoring was periodic and somewhat haphazard. The increase in digital surveillance and the advent of big data has widened, deepened, and intensified the data gaze (Beer, 2019) and works to extend self-disciplining and associated disciplining measures (Kitchin and Dodge, 2011). This is being complemented with a control mode of governmentality in which an individual is subject to constant monitoring and modulation of behaviour, as the means by which a task is completed is also the means of governance (Deleuze, 1992). Rather than behaviour being shaped by fear of surveillance and sanction, in control systems individuals are corralled and compelled to act in certain ways, their behaviour explicitly or implicitly steered or nudged (Davies, 2015). That is, they are not self-disciplining their behaviour in relation to an external gaze, but their behaviour is actively reshaped through its digital mediation. For example, the work of checkout operatives in supermarkets is no longer disciplined through the gaze of the supervisor

or CCTV monitoring work rate; now, the mode of work – the scanning of items – becomes the mechanism of capturing and regulating behaviour, continually monitoring performance and informing the worker to speed up if the scan rate is too slow (Kitchin and Dodge, 2011). As Davies (2015) notes, smart city developments and technologies are designed to capture, modulate, and nudge behaviour. His example is Hudson Yards in New York, a development saturated in sensors and embedded computation designed to continually monitor and modulate behaviour of residents and workers.

The introduction and operation of systems designed to reconfigure governance is thoroughly infused with data politics and data power, given what is at stake with respect to governmentality, democracy, and ethics. As is evidenced in places such as Hong Kong, where smart city technologies have been an important element in the new security apparatus designed to quell the democracy movement, systems that facilitate capture and control, automation, and prediction have profound social and political impacts (Lee and Chan, 2018). The use in Europe and North America of mass surveillance, the militarization of policing, the erosion of privacy and human rights, and the continual drift of control creep (in which systems designed for one purpose are enrolled into another) highlights that concerns regarding the path of data power is not limited to authoritarian regimes (Graham, 2011; Kitchin, 2021). Indeed, there are a whole series of ethics concerns relating to unfair and discriminatory treatment enacted within smart city systems (Kitchin, 2016). Consequently, while companies and states dominate the discursive landscape, and largely set the parameters for prevalent data regimes, data power is being met with resistance and counter-narratives and actions by other stakeholders designed to transform how digital devices, systems, infrastructures, and platforms work and produce alternative urban data futures.

Data justice and the city

Data capitalism and data-driven forms of governance, and the associated shift in governmentality, clearly raise a number of concerns relating to uneven and unequal distribution and consequences of data power, and how such power often deepens rather than addresses urban crises. The lives of individuals and communities are impacted in ways that suit the desires of capital and state power, with data power reinforcing and reproducing iniquitous structural relations. Data power is not, however, simply accepted on its terms, but is countered by resistance that directly opposes its operations or subverts and transgresses its intent. This occurs in a number of ways that can be loosely grouped into data ethics and data justice approaches.

Data ethics consists, on the one hand, of normative thinking concerning data-driven technologies and their practices, and, on the

other, applied ethics that seeks to translate normative ideas into practice action. Normative ethics generally consists of applying ideas related to what can be considered right or wrong to data-driven systems (Kitchin, 2022); for example, advocating the design and operation of systems that conform to ethical positions such as deontology, consequentialism, virtue ethics, and ethics of care, each of which prioritizes a different value of assessment: following agreed rules, consequence of outcomes, intent to do the right thing, and treating others as one would want to be treated (Vaughan, 2014). Advancing normative ethics in relation to data-driven technologies aims to shift the ethos, principles, and values underpinning their development. In applied terms, normative arguments are mobilized in counter-narratives to free-market and neoliberal ideologies of data capitalism and laissez-faire governance, usually employing ideas centred on transparency, accountability, fairness, access, equity, rights, and citizenship. These notions are translated into more concrete interventions such as policy, regulations, law, and governance and management arrangements, designed to put in place checks and balances to the excesses of capital and institutional power (Kitchin, 2022).

A variety of actors, such as community groups, activist networks, civil liberties NGOs, and progressive political parties, working at different scales from the local to global, are actively involved in formulating and enacting data ethics in order to limit and redistribute data power. For example, at the international scale, NGOs such as the Electronic Frontier Foundation, Privacy International, Amnesty International, and European Digital Rights campaign for policy and legislative interventions related to privacy and data protection. Their work has led to interventions such as GDPR (General Data Protection Regulation) in Europe that obligates data controllers and processors to treat data in defined ways and provides citizens with rights with respect to data related to them (Voigt and von dem Bussche, 2017). At the same time, companies and states have embraced the notion of data ethics as way of setting up acceptable bordering principles around how data should be treated and used, and reassuring the public that their concerns are being taken seriously. This often results in advocacy for market-led, self-regulation (Crain, 2018) or the establishment of ethics advisory networks or boards, such as the Cities Coalition for Digital Rights, Seattle Community Technology Advisory Board, Amsterdam Tada!, and Smart Dubai AI Ethics Board.

While data ethics are important for challenging and tempering data power, for some critics and stakeholder actors they do not go far enough. Data ethics, it is argued, is too narrow in conception, locates the sources of concern in individuals and technical systems rather than social structures, pursues instrumental and procedural solutions rather than systemic change, and is too easily co-opted by those whose practices they seek to transform

(Dencik et al, 2016; D'Ignazio and Klein, 2020). As such, rather than fundamentally challenging and reconfiguring data power, it is contended that data ethics merely curbs particular practices, rather than addressing the root, structural conditions that enable discriminatory and exploitative data work, and thus continue to serve the vested interests of companies and states (D'Ignazio and Klein, 2020). While data ethics provides some protections, it does little to roll back, or offer a genuine alternative to, the operations of data capitalism and state dataveillance. Data policy, regulations, laws, and governance models continue to enable data capitalism to monetize data and accumulate profit through data colonialization, and facilitates states to enact data-driven governance in ways that reproduce uneven and unequal social relations. As D'Ignazio and Klein, (2020, 60) argue, a compliance regime set on the terms of companies and states will not address the ways in which discriminatory and exploitative data power pervades data-driven systems; data ethics are merely 'technological Band-Aid[s] for [...] much larger problem[s]'. These Band-Aids tackle symptoms not root causes, and they provide a captivating diversion from addressing those root issues (Powles and Nissenbaum, 2018).

Instead, D'Ignazio and Klein (2020) call for data justice rooted in a different set of concepts (justice, oppression, equity, co-liberation, reflexivity, contextual integrity, *in addition to* ethics, bias, fairness, accountability, transparency, understanding algorithms), wherein data power is recognized as a structural relation that cannot be ameliorated at the technical or individual level alone. They hold that the concepts of data ethics are valuable and useful, but in and of themselves they will not produce fair and just data regimes. Instead, a more radical shift in thought and praxis is required if a more equitable digital society is to be realized. Data justice applies the theories of social justice to data-driven systems and processes (Dencik et al, 2016), mapping out the logics, structural conditions, and operations of data power, charting data harms and their consequences, scoping alternative data futures and how they might be produced, and examining how groups are working to enact data activism and claim data sovereignty (the ability to control their data relating to them). Typically, the underlying moral philosophy of data justice draws on feminism (D'Ignazio and Klein, 2020), Marxism (Sadowski, 2019), and critical social theory more broadly (for example, Dencik et al, 2016; Taylor, 2017), with five forms of data justice identified (Cinnamon, 2017; Heeks and Renken, 2018; Robinson and Franklin, 2020): *instrumental*, concerned with the fair use of data and just outcomes; *procedural*, focusing on harms produced through data practices and processes, the 'biases and inequalities baked directly into data' (Cinnamon, 2017, 622); *distributional*, and the equitable distribution of data, associated resources, and data-driven outcomes; *recognition*, and the enactment of equal respect, rights, and treatment across all data subjects; *representation*, ensuring equal voice and

ability to shape and challenge data power across all data subjects. These components of data justice have been examined with respect to smart cities and urban data power through the work of [Cinnamon \(2020\)](#), focusing on the data politics of services in Johannesburg and Cape Town, and [Robinson and Franklin \(2020\)](#) and their analysis of urban sensor networks in Newcastle and Chicago.

Data activism and advocacy is a means to seek data justice: to challenge and transform data power into more equitable arrangements. In broad terms, it take two main forms ([Milan and van der Velden, 2016](#)). Reactive data activism aims to challenge, reconfigure, and dismantle asymmetric data power through political protest, legal cases, and advocacy and lobbying for policy change and regulation. At its most radical edge, it could involve widespread civil disobedience, vandalism, and hacking, as with the Umbrella protests in Hong Kong, which in part sought to block mass surveillance and data-driven security ([Lee and Chan, 2018](#)). Proactive data activism aims to use data (open data and self-generated) as a resource for political action and social change ([Milan and van der Velden, 2016](#)). Such work includes civic hacking, hackathons, and citizen science, all a means by which citizens produce their own data-driven solutions to social issues. In a number of cases, advocacy and activist organizations enact both forms of data justice. For example, the Detroit Digital Justice Coalition and Stop LAPD Spying Coalition, aided by national-level bodies such as the American Civil Liberties Union and Data for Black Lives, fight to change discriminatory practices such as social sorting, redlining, and data-enabled institutional racism, and also use data to campaign for social change ([Currie et al, 2016](#); [Petty et al, 2018](#)). In so doing they aim to claim data sovereignty; that is, assert some level of authority and control over the data that relate to them and how those data are generated and used ([Kukutai and Taylor, 2016](#)). Data sovereignty has its roots in the claims of Indigenous peoples to the right to maintain, control, and protect their cultural heritage, traditional knowledge, and territories, and determine and govern how data related to these are produced, used, and shared ([Mann and Daly, 2019](#)). Such rights have long been denied, with data being extracted without consent within colonial relations for ends that rarely have been to their benefit ([Kukutai and Taylor, 2016](#)).

While the discussion so far has largely been a dualistic characterization of data ethics and data justice in opposition to data power, it is important to note that power, including data power, is never a simple binary of domination and oppression, imposition and opposition ([Sharp et al, 2000](#)), but is relational and entangled, often being fragmentary, uneven, inconsistent, and paradoxical. Individuals and institutions can simultaneously wield and be subject to various forms of data power. For example, a municipal worker might exercise data power in relation to a resident, but their own actions

are subject to the monitoring of a line manager (which might be informed by feedback from citizens), and is sited within the governmentality of the institution, and local and national systems of oversight and benchmarking. Municipal workers both express and resist data power, with [Kitchin et al \(2017\)](#) noting the internal politics and contestation between units and staff within municipalities regarding smart city developments. This was also evident in the Toronto case, with an entangled, relational field of power struggles occurring within and between various bodies: corporations, municipal bodies, semi-state agencies, community groups, political parties, professional associations, university institutes, and others ([Tenney et al, 2020](#); [Hodson and McMeekin, 2021](#)). Data power, then, is not imposed unilaterally, countered by data justice, but unfolds through complex relations of negotiation, persuasion, coercion, intimidation, alliances, betrayal, protest, advocacy, avoidance, subversion, and other tactics, between various constituents. These tactics play out spatially, with data-driven smart city initiatives 'subject to various territorializing and deterritorializing processes whereby local control is fixed, claimed, challenged, forfeited and privatized' ([Duncan, 1996, 129](#)).

While it is tempting to cast the Toronto case as a 'David' (community opposition) slayed 'Goliath' (Google Sidewalk Labs) tale in which data justice triumphed over data power, in reality it was a much more entangled, relational story in which various coalitions of actors sought differing outcomes, ranging from conditional support if changes were made to calls to end development. On the oppositional side, two coalitions included an independent lobby group, Toronto Open Smart Cities Forum founded by a university research centre, and a resident-led protest group, #BlockSidewalk, which sought to enact data justice. To counter their challenges, Sidewalk Labs appointed a digital strategy advisory panel, a data governance advisory working group, an advisory council of Canadian urban thinkers, a residents reference panel, and ran civic labs forums open to any member of the public ([Vincent, 2019](#)). A number of members of the Sidewalk Labs initiatives hoped to be able to shift the corporation's thinking and actions from the inside through their participation, but subsequently resigned over concerns with how the project was unfolding ([O'Shea, 2018](#)). This entangled field of relations stifled progress and led to Sidewalk Labs withdrawing from the Quayside development. However, it did so with the clear intention of trying again elsewhere, rather than folding or fundamentally shifting its smart city model. It is important then to be sensitive to, and unpack carefully, these relational and spatial operations of data power; in part, to detail the complexities of 'actually existing smart urbanism' ([Shelton et al, 2015](#)) and its data power, but also to provide insights into effective tactics for how data justice can be successfully achieved.

Conclusion

Urban data power is the product of political economies, mobilized to assert the entwined interests of states and companies, supposedly in order to tackle urban crises. Data power is central to the machinations of data capitalism, expressed through the asymmetric relations of data colonialism and the desires to accumulate through data dispossession and development and expansion of new data products, services, and markets. States leverage data power to more effectively and efficiently monitor and regulate populations, deepening regimes of surveillance and enabling a transition to control governmentality. Likewise, companies are using data-driven systems to govern worker performance in order to increase productivity. Data power, however, is not a unidirectional force, exerted as domination over weaker groups. Rather, data power is relational, contingent, contextual, and entangled in complex ways, and is variously scaled from the local to the global. Consequently, just as there are varieties of capitalism (Peck and Theodore, 2007), neoliberalism (Brenner et al, 2010), and smart urbanism (Caprotti and Cowley, 2019), there are varieties of data power associated with them.

Forms and expressions of data power vary in line with political economies and other axes of power such as nationalism. While many of the infrastructures, systems, and practices utilized are the same, how data power is mobilized, exerted, and its consequences, differ between democratic and authoritarian regimes. Mass state surveillance in China, and the deep interlinkages between state and corporate dataveillance, notably in its diverse social credit scoring apparatus (Liang et al, 2018), has a different character to the fractured state surveillance and its disconnect from corporate data regimes in Europe, where GDPR (and prior to that Fair Information Practice Principles) limits a state–industry data nexus (Kitchin, 2022). The ability to seek data ethics and data justice, and to practise data activism and claim data sovereignty, is also markedly different, with the Chinese state limiting and punishing opposition to its data regimes. This has been particularly evident in its handling of the democracy movement in Hong Kong and the installation of an extensive data-driven surveillance and security apparatus to quash dissent (Lee and Chan, 2018; Liao, 2020). Of course, data justice and activism are also opposed in the West by those that gain through data power, but there is more scope to fight for change without severe penalty.

Similarly, urban data power varies contextually, with the visions, objectives, and systems deployed varying across jurisdictions. In India, the 100 Smart Cities programme is part of a political, nationalist development agenda (Datta, 2018). In the UK, smart cities are part of a shift to a technocratic, neoliberal governance regime and demonstrator initiatives for exportable

business opportunities (Caprotti and Cowley, 2019). In Germany, smart cities are about efficiency of urban governance and sustainable growth (Skou and Echsner-Rasmussen, 2015). In Japan, smart cities aim to address sustainability and create adaptive environments for an ageing population (Trencher and Karvonen, 2019). Within jurisdictions, smart urbanism varies based on the political regime, political administrative geography, state apparatus and governance structures, resources, and capacities of cities. For example, urban data power associated with the smart city initiatives of Barcelona shifted markedly with the change in government in 2015, with a neoliberal vision of a smart city replaced by a socialist view and the adoption of the principles of technological sovereignty (that systems have to reflect and prioritize the needs of citizens not corporations and states), open access data, software and infrastructure, and extensive citizen engagement in decision-making (Charnock et al, 2021). The fractured political administration of Metropolitan Boston, with its 101 autonomous towns and cities, limits data power at the metro scale, instead decentralizing it locally, where it can be variously expressed (Kitchin and Moore-Cherry, 2021). This is quite different to cities with a unitary metropolitan governance, such as New York, where data power is unified across the city-region.

Urban data power, then, needs to be examined and theorized within these terms: as a political-economic set of contingent, contextual forces and relations. Such work requires the carefully teasing out of its general characteristics and how it is mobilized, utilized, and contested in specific cases.

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