Title: Here and Now by Us: Smart urbanism and the promise of the real-time city

Abstract

Around the world, municipalities are investing in smart city technologies to address the challenges they face. Beneath these investments is a shared enthusiasm for what Kitchin (2017) calls the “real-time city,” and the idea that new technologies will help to measure, manage, and optimize urban life in real-time. But what does it mean for a technology or a city to operate in real-time, and what is the relationship between real-time and the intelligence of digital systems? Who is the real-time city for, and what might it mean to deem certain forms of knowledge and engagement more ‘real’ than others? This paper answers these questions by positioning ‘real-time’ against the backdrop of what Jacques Derrida calls a “metaphysics of presence.” Against this backdrop, I suggest that the meaning and value of ‘real-time’ within the smart city discourse is threefold. First, real-time is understood to be *the time of what is real,* affirming the idea that new technologies provide an objective and immediate account of urban life. Second, the idealization of ‘real-time’ affirms the objectification (and therefore realness) of time itself, positioning time as a resource to be quantified, valued, and saved. Third, real-time is associated with instantaneity, immediacy, and ubiquity, decontextualizing digital infrastructure in ways that characterize ‘real-time’ as no time (or space) at all. Through these three pillars, I argue that enthusiasm for real-time encourages a top-down and technocratic approach to city-building – one that privileges certain ways of knowing, navigating, and engaging with the city over others.

**1.0 Introduction**

 The fabric of the contemporary city is increasingly fibreoptic. Around the world, expanding webs of sensors, data, and algorithms are involved in everything from traffic management and snow removal to healthcare and affordable housing (Kitchin 2023; Sadowski 2020; Green 2019; Townsend 2013). Updated websites and mobile applications serve as key interfaces for municipal services, where residents can pay tickets, hail rides, report issues, and more (Taylor et al. 2021; Zwick and Spicer 2021). These new technologies reflect broader shifts in urban development, and an emergent interest in the construction of so-called *smart cities.* The most recent in a long line of idyllic visions, smart cities promise to use new technologies to create better communities, empowering local officials to respond to challenges like rapid urbanization, aging infrastructure, climate change, and more (Lorinc 2022).

 While the technologies associated with smart urbanism are incredibly diverse, the discussion surrounding these technologies reflects an underlying appreciation for what Kitchin (2017; 2023) calls “the real-time city.” Enthusiasm for smart cities is often underpinned by the assumption that affiliated technologies will operate – or empower other services to operate – in ‘real-time.’ As Kitchin (2017) explains, “the appeal and promise of smart cities is that they constitute ‘real-time cities,’ composed of systems that work 24/7 and are reactive to unfolding events in order to optimize performance and gain efficiencies.” From connected traffic lights that adjust to changing traffic flows to complex algorithms that coordinate waste collection using data from sensor-embedded garbage bins, the capacity to observe and manage urban life in real-time is critical to the allure of smart city projects.

 But what does it mean for a technology or a city to operate in ‘real-time,’ and what is the relationship between real-time and the intelligence or utility of digital systems? What does enthusiasm for real-time assume about the relationship between technology and urban life, and what does it potentially overlook? As references to real-time grow more common, it has become increasingly difficult to identify a single, exhaustive definition of the term. There is a consensus among politicians and technologists that real-time technologies are preferred, and that they will make cities better and more convenient, but it is not clear why, or where this enthusiasm for the real-time city comes from. In fact, the relationship between ‘real-time’ and the broader smart city discourse has remained curiously unexplored even as concerns surrounding smart urbanism have grown. Researchers have instead focused on pragmatic concerns around privacy (Bannerman and Orash 2020; Sadowski 2020), privatization (Flynn and Valverde 2019; Zuboff 2019; Sadowski 2020), technological bias (Artyushina 2022), and more.

 There is also the second order, though no less important, question of who the ‘real-time city’ is for. What does enthusiasm for real-time assume about the people who reside and work in cities, and what does it potentially erase? What forms of civic engagement are privileged as municipalities embrace ostensibly real-time technologies, and what are the risks or drawbacks of excluding alternative forms of participation in public life? A preliminary scan of the technologies deployed in smart cities suggests that the ‘real-time city’ is more exclusive than often promised. As some cities begin to experiment with connected and autonomous vehicles, for instance, many within these cities still struggle with basic connectivity and underfunded public transit (Clark 2020). In other cases, the same technologies that provide services to some depend on the expropriated labour of others – such as the low-wage workers in the Global South who train the machine learning algorithms used in smart city technologies around the world (Tubaro and Casilli 2019; Tubaro, Le Leduc, and Casilli 2020; Sharma 2014). Discrimination is not always accidental to smart city technologies, either. Around the world, new combinations of sensors, cameras, and artificial intelligence are being used by law enforcement agencies to monitor and police urban behaviour in ‘real-time,’ often exacerbating histories of discrimination against indigenous, racialized, and otherwise vulnerable populations (Sadowski 2020; Eubanks 2018). Taken together, such examples suggest that the 'real-time city’ is not for everyone, with new technologies instead contributing to inequity between and within cities. There is an accordant need to clarify the relationship between ‘real-time’ and the diversity of urban life. What is the function of real-time in such heterogeneous contexts, and what are the political implications of deeming certain times to be more *real* than others?

 With such questions in mind, this project explores the discursive politics of real-time within the context of contemporary smart urbanism. To do so, I position enthusiasm for real-time against the backdrop of what French philosopher Jacques Derrida calls a ‘metaphysics of presence.’ I argue that enthusiasm for real-time is an extension of much older ideas about time, technology, and knowledge, with privilege given to those deemed capable of determining both what is present (i.e., what *is*) and the nature of the present (i.e., the nature of the *is* as such).

In this view, the function of real-time in the smart city discourse is threefold. First, real-time technologies are presumed to eliminate mediatory gaps between the city and its availability to residents, policymakers, and the private sector, most notably in the form of data. Real-time is thus understood to be, first and foremost, *the time of what is real.* Second, I argue that the idealization of real-time affirms neoliberal and capitalistic approaches to time, in which time itself is characterized as a resource that can be quantified, valued, and saved through digitization. In addition to being the time of what is real, real-time thus affirms *the realness of time.* Third, and finally, I suggest that the association of real-time with instantaneity, immediacy, and ubiquity encourages the decontextualization of digital infrastructure. To that end, references to real-time uphold the idea that new technologies are uncompromised compared to the contingent and embodied heuristics of local actors and institutions, with real-time assumed to be *no time (or space)* at all. Through these three pillars, I argue that enthusiasm for real-time encourages a top-down and technocratic approach to city-building – one that privileges certain ways of knowing, navigating, and engaging with the city over others. The result is the further encroachment of the private sector into local governance.

**2.0 Metaphysical Foundations of the Real-Time City**

 Though references to ‘real-time’ are incredibly varied, existing scholarship has nevertheless noted a persistent association between real-time and the idea or experience of *presence.* Coleman (2018, 601) writes, for example, that real-time “must be understood in terms of a ‘present’ temporality; that is, a temporality that is focused on the now and immediate.” In a more recent article, Coleman (2020, 1681) writes that real-time “emphasizes ‘the now,’ or the present.” Lupinacci (2022) argues similarly that real-time technologies maintain a “sense of presentness,” even as the specific pace, schedule, and function of these technologies might differ. Despite the variability associated with real-time systems, there is thus an implicit connection between the meaning and value of real-time and the meaning and value of presence more generally.

 This appreciation for presence (or the present) is nothing new. Jacques Derrida (1967[2016]) argues, for instance, that, Western political thought has, since Plato, been anchored by a “metaphysics of presence”: the endeavour to determine both what is present (i.e., what *is*) and the nature or meaning of this presence (i.e., the nature of the *is* as such). This pursuit, Derrida suggests, has been driven by the assumption that the present is both the character and container of being and truth – the arena of things that *are.* In his biography of Derrida, Salmon (2021, 5) describes the “metaphysics of presence” as “the unexamined assumption and therefore privileging of the notion that consciousness is fully present, that the world is fully present, and that we can analyze it with concepts which are fully present and that, in some sense, exist as things.” The present is, as it were, *out there,* waiting to be discovered.

 In turn, privilege has historically been given to those deemed most capable of determining both what is present as well as the nature and value of this presence more generally. For Plato, this role is occupied by human beings and, more specifically, philosophers, for whom transcendent truths about the nature of present things are inscribed upon the “living memory” of the soul, drawn forth from within through observation and discourse. As Plato (2005) writes in *Phaedrus,* “only a philosopher’s mind grows wings, since its memory always keeps it as close as possible to those realities by being close to which the gods are divine.” In this view, the present is deciphered according to an unchanging and transcendent order that is brought to bear on the here and now (i.e., made present) through the revelatory operation of philosophical discourse. Derrida calls this a logocentric metaphysics, whereby the here and now of the present is named, understood, and valued in relation to an unchanging and transcendent order (i.e., the logos).

 For Plato, this logocentric metaphysics is underpinned by a *phonocentrism*: the privileging of the voice – and the human voice specifically – as the most immediate expression of the living memory from which insights into the logos are drawn. Unlike writing, which detaches the sign from its author, speech remains necessarily connected to the expressive intent of the speaker; when someone speaks, they know what they mean. There is an immediacy, then, between the phonetic sign and the signified idea. This means that speech is necessarily more proximate than writing to the signified logos – to the *sense* of the word (Foran 2016, 121). As Derrida (1967[2016], 11) puts it: “the essence of the phonè would be immediately proximate to that which within ‘thought’ or logos relates to ‘sense’… it is that the voice… has a more proximate relationship of essential and immediate proximity with the soul.” We might therefore say that the signified (i.e., the logos) is present in – and immediate with – the spoken word in a way that it is not present for the written sign. “Absolute proximity of voice and being,” writes Derrida, “of voice and the meaning of being, of voice and the ideality of meaning” (1967[2016], 19).

 This celebration of the spoken word corresponds to a reactionary devaluation of that which is deemed external to, and derivative of, the voice. In Plato, for instance, the celebration of speech is mirrored by the rejection of writing as a stagnant, artificial, and derivative auxiliary for the spoken word (Derrida 1967[2016], 13). The criticism of writing is twofold. On the one hand, writing is decried as being removed from – and so external to – the direct expression of the signified. Writing is devalued for being “a mediation of a mediation,” severing the direct connection between sign and signified that is assumed in the apparent immediacy of hearing-oneself-speak (1967[2016], 13). On the other hand, writing is criticized for its externalization of the signified in the form of an inscription, a mark (or trace) that is (literally) external to, and so removed from, the signified that it attempts to name. Whereas speech remains connected to the internal and expressive intent of its author (and thus to the logos), writing puts the idea (i.e., the signified) out there – in a particular place and time – a particular context – that is removed from the timelessness and transcendentality of the signified itself. To the extent that languages may evolve and disappear over time, inscription also exposes ideas to (mis)translation, (mis)interpretation, and even indecipherability, as what is written down today may be lost to history tomorrow. In addition to its mediatory character, writing is thus devalued as a harbinger – the implied condemnation of a death-to-come. “Writing in the colloquial sense is dead letter,” says Derrida, “it is the carrier of death. It takes the breath out of life” (1967 [2016], 13).

This same devaluation is applied to technology more generally. Like writing, technology has been associated with materiality, compromise, and corruptibility. To understand the privilege given to technology today, it is therefore necessary to trace the re-evaluation of presence that emerges in the Enlightenment. In Descartes, for instance, there is a mathematization of presence that sets the stage for an empirical turn within metaphysics – one more sympathetic to the machinations of modern computers (Bradley 2011). Reflecting the emergent popularity of Newtonian physics and a theological shift towards an intelligent Creator who speaks “in the language of mathematics,” Descartes and others reframe presence as a closed, rational system in which the parameters of present objects, and the relationships between them, can be calculated, controlled, and improved (Bradley 2011, 73). As Bradley (2011, 73) puts it, faith in a “mechanized cosmos” leads to the gradual reconceptualization of the present as “a physico-chemical object governed by invariant rules that are capable of being broken down, calculated, and reassembled differently” (Bradley 2011, 73).

The result of this reformulation is an epistemological shift towards measurement, abstraction, and categorization. In this view, the present is named and prescribed meaning through its quantification – a paradoxical turn whereby space and time become increasingly objectified (i.e., measured) in their own right (Kitchin 2023). Objects are assumed to be present to the extent that they can be accounted for within these calculative matrices – present according to their spatial and temporal dimensions. “To such a class of things,” writes Descartes (1996 [1641], 7) of present objects, “pertains corporeal nature in general, and its extension, the figure of extended things, their quantity or magnitude and number, as also the place in which they are, the time which measures their duration, and so on.” In turn, the relationships between these objects are increasingly understood according to generalizable patterns of cause and effect capable of being measured, abstracted, and modelled (Hayles 1999). Through all of this, the belief that time itself is a universal and objective arena for present objects, capable of being quantified and valued, is reinforced (Kitchin 2023). Descartes’ empirical turn is thus underpinned by an emphasis on the dimensionality of objects in both space and time, and the assumption that the nature of presence can be articulated most immediately (i.e., most purely) in the same mathematical language used by the divine.

 This mathematization of the logos is accompanied by a recurring skepticism of the body – increasingly understood as the limiting and object vessel of a rational and transcendental mind. Descartes (1664) writes that

The body is nothing else but a statue or earthen machine, that God has willed the form entire, in order to make it as similar to us as is possible. Thus he not only would have given it the external color and shape of our members, but also he put in the interior all the parts which are required to make it walk, eat, respire, and that it imitate, in the end, all of our functions which can be imagined to proceed from matter alone, and depend only on the disposition of the organs.

The same mechanistic framework applied to present objects is thus turned against the human body, which is framed in increasingly instrumental and material terms (Vaccari 2012). The same divide found in Plato between the transcendent logos and the embodied present is thus repeated in a Cartesian dualism between the body and an immaterial cogito, for whom the capacity for rationalization is intrinsically prescribed (Marder 2011; Wolfe 2009). The body, like the present more generally, is understood in increasingly empirical terms, quantified, categorized, and rearranged according to its constitutive and mechanical parts.

It is in this context that machines, and eventually computational systems, become increasingly celebrated as a way for human beings to supplement, accelerate, and perfect the types of rational calculations that are otherwise constrained by the human organism (Bradley 2011). The limits of bodily machines are overcome by the expanded capacities of mechanical systems and prostheses, which execute and operate according to complex equations more quickly and efficiently than their human counterparts. There are affinities, here, between Descartes’ mathematization of the transcendent and the efforts of contemporary transhumanism, which seeks to improve, overcome, and transcend the body using modern computers. Perhaps most famous is Ray Kurzweil, whose book *How to Create a Mind* draws close connections between Descartes’ conception of the rational mind and the potential for machine learning algorithms to create an “artificial superintelligence” (Kurzweil 2012). Frodeman (2019) writes, to that end, that transhumanism “announces the practical fulfillment of Descartes’ dream that, once we had mastered that peculiar philosophy that we have come to call science, the mind (and now the body) will no longer be contained within any limits.”

**3.0 The Urban Equation**

Though names like Plato and Descartes do not readily appear in contemporary urban studies, their ideas about presence – and the pursuit thereof – are reflected in the emergence of increasingly technocratic approaches to city building, and the use of new technologies to measure, decipher, and reconstruct urban spaces at an unprecedented pace and scale. Indeed, while monitoring, recording, and managing urban activity have always been a part of city governance, the documentation and control of urban life has exploded with the growth of computational power (Gray and Marres 2023, 117). Understanding this evolution promises important insight into the role of real-time today, and the position of real-time within the broader smart cities discourse.

 Unlike premodern approaches to city building, which often had to work around, and in relation to, local geographies, modern urban planning has leveraged technological innovation to shape and impose ideas upon local environments with increasing fervour. As Cugurullo (2021, 49) explains:

The condition of modernity is about dreaming of the possibility of an alternatively reality and realizing that dreams can become true by unleashing the power of technology to materialize then… While the planning and design of the Medieval city tended to accommodate the morphology of the natural environment, the Renaissance city is not afraid to alter the landscape in order to accommodate the will of the urban developer.

Urban development following the Enlightenment is thus marked by a decided shift towards the imposition of order and the manipulation of local geographies, accelerated by the Industrial Revolution and the advent of methods and machines that allowed planners to overcome material constraints (Cugurullo 2021).

 As such techniques have become widespread, practitioners have increasingly sought to identify and calculate the ingredients and relationships that are foundational to successful cities, with planners working to establish an ideal and sustainable balance between competing land uses, emergent class divides, and more (Cugurullo 2021). Modern urban planning thus mirrored (and learned from) the logocentric philosophizing described above, with planners working to identify and render (i.e., make present) an essential (and sustainable) urbanity. This period corresponds with the masterplans of figures like Le Corbusier and Ebenezer Howard, whose efforts to construct idealized urban communities often came at the expense of local knowledges and cultural difference (Lopez-Duran 2018). Gray (2022) notes that this period also aligns with the expansion of modern zoning bylaws across Canada and the United States, reflecting emergent interest in comprehensive, top-down approaches to urban development.

 It was not until the rapid expansion of computational capacity in the 1950s and 1960s, however, that such techno-solutionist dreams became a fixture of mainstream urban policy, with many believing that digital technologies might finally crack the urban code (Kitchin 2014; Krivý 2018). By the late 1950s, computers were being used to monitor, manage, and model urban infrastructures (Kitchin 2017). In the 1960s, these practices intersected with cybernetic thinking to frame cities in terms of their social, economic, and infrastructural systems. As Kitchin (2017, 19) explains, cybernetics affirmed the belief that a city is “a system of systems” capable of being “broken into its constituent parts and processes… and modelled and simulated to capture its essence and to plan and operate its functions.” During this time, urban dynamics schools and mathematical modelling gained prominence among urbanists, with new technologies viewed as the “oracles” that would predict (and so deliver) the future city (Harrison and Donnelly 2011).

 Söderström et al. (2014) argue that the influence of cybernetics on urban development has its roots in William Harvey’s theory of blood circulation in the early 17th century. Like Descartes, Harvey imagined the body to be a mechanical system composed of hearts, arteries, and veins, capable of being modelled and deciphered through empirical observation. Drawing on Harvey’s ideas, Söderström et al. (2014) argue that urban planners came to increasingly view the city through the lens of bodily health, with words like ‘arteries’ and ‘veins’ translated into urban contexts to describe city streets and other infrastructure (see, also, Sennett 1994). Cybernetics thus entrenched the modernist conceptualization of cities as complex (but decipherable) systems, with this perceived complexity often serving as justification for further technologization (Söderström et al. 2014; Cugurullo 2021).

 A decade later, as computing power became less expensive, government and industry began using digital technologies more extensively to archive and process records. This period also saw the diffusion of the internet and, by the 1980s, personal computers and specialized software were being used in government operations around the world (Kitchin 2023). The next two decades saw increasing connectivity and further investments in e-government tools, enhanced by the popularization of smartphones in the early 2000s. Personal computing enabled connectivity “to become pervasive, ubiquitous, and instantaneous,” allowing policymakers (and technology vendors) an increasingly granular view of urban life (Kitchin 2023, 33). Batty (2013) argues that “it was digital miniaturization that… really changed the game,” enabling cities to generate “unprecedented quantities of data” about urban behaviour and municipal services. Van Zoonen (2016) writes similarly of the “data avalanche” that followed the popularization of connected technologies, expanding surveillant potential previously kept to civil registrations, surveys, and bureaucratic records. Though top-down approaches to urban development were, by this time, common, digital technologies promised unprecedented capacity to recognize, solve, and actualize these essential machinations, allowing planners to build (i.e., present) idealized cities according to more precise specifications. The intersection of cybernetic thinking with urban governance has thus facilitated the reconceptualization of cities as “technology problems” composed of pieces – or variables – that can be identified, quantified, and rearranged according to their situation within a calculable order that is too complex for the heuristics of human actors (Green 2019).

Against this backdrop, the smart city movement has promised to actualize longstanding beliefs about the city and its constituent processes (Green 2019; Cugurullo 2021). Insofar as cities are assumed to mirror the growth patterns of biological systems, Batty (2008) argues that smart city technologies are a resource for identifying (and maintaining) the “organic order” of urban environments. Nam and Pardo (2011) argue similarly that “a smarter city should be treated as an organic whole – as a network, as a linked system.” There is thus a connection between smart urbanism and systems thinking, which views cities through the lens of biological and ecological systems governed by patterns of connectivity and exchange (Batty 2008). These ideas were foundational to the early appreciation for smart urbanism in firms like IBM, who translated existing focus on nervous and circulatory systems to the social and economic networks of urban life (Harrison and Donnelly 2011). In this view, the goal of digital systems is to “translate the city into a single language,” providing policymakers and technologists with a singular and comprehensive view of the city (Söderström et al. 2014). In doing so, the hope is that digital infrastructures will encourage the pursuit of balance, sustainability, and homeostasis, protecting cities against “the relentless march of deterioration” (Krivý 2018).

 Cugurullo (2021) describes the proliferation of top-down approaches to city building as an emergent interest in what he calls “the urban equation,” understood as “the core elements of a city which combined in a given proportion are supposed to produce sustainable cities” (2021, 2). Like the body, cities have been increasingly understood as a collection of objects and processes that can be diagnosed, modelled, and rebuilt according to abstracted specifications – an equation that can then be transposed to other contexts and applied to the development of other cities. It is here that the metaphysical currents we have been exploring begin to intersect with the foundations of contemporary smart urbanism, with new technologies building and adjudicating cities according to transcendent equations that only they can reveal. In this view, the goal of smart city technologies is to uncover “the fundamental laws of geography,” reducing urban policy to the empirical (and imperial) science of city building (Shelton, Zook, and Wiig 2015). It is in this sense that Krivý (2018) identifies “an eschatological optimism” in the smart city movement, with digital infrastructure promising to deliver the type of insight and control that has been pursued since the advent of modernist planning.

 In turn, proponents of the smart city imagine themselves as providing scientific and objective solutions to urban ills (Kitchin 2014). As Söderström et al. (2014) explain, smart urbanism is “an engineering epistemology applied to humans and non-humans,” with urban development reduced to an exercise in data processing and calculation (314). Ginni Rometty – ex-CEO of IBM – suggests that the goal of smart urbanism is to move cities “from gut-feeling and impression to knowledge,” providing policymakers access to the urban equation and the unprecedented capacity to actualize it (Söderström et al. 2014, 312). To that end, Mattern (2016) writes that “technoscientific urbanism reflects a neopositivist return to postwar systems thinking and centralized planning; it is especially visible in the discourse around ‘smart cities,’ which regards the intelligence generated from spatial sensing and data analysis as a ‘fix’ for perennial urban problems.” That this is a revelatory or prophetic exercise is evident in the way data are often viewed as trapped, lost, or unavailable prior to the implementation of smart city technologies. They are “underused,” with smart city technologies promising to unlock, “unleash,” and deliver their true potential (Söderström et al. 2014).

In many ways, then, enthusiasm for presence runs full circle, beginning with a rejection of technology before returning to technology – and digital technologies specifically – as an adjudicator of truths both within the city and beyond. The present is conceptualized as a discrete moment in time capable of being quantified, deciphered, and rearranged according to its position within a transcendent, rational matrix. From Plato to Descartes, the consistent assumption is that the present exists prior to its measurement, awaiting discovery and the revelatory work of philosophic and then empirical inquiry. This appreciation for the decipherable present finds its way into modern urbanism through figures like Le Corbusier and Ebenezer Howard, embedded in the smart city movement through the intersection of modernist planning with cybernetics in the mid-20th century. In this view, smart city technologies promise to present planners and policymakers with the data and calculations that will empower them to build more balanced and sustainable communities, with insights that can then be extrapolated, transposed, and exported across divergent political contexts (Cugurullo 2021).

**4.0 The Meaning and Value of Real-Time**

 Within this context, the meaning and value of real-time as it appears in the smart city discourse is threefold. First, real-time technologies promise to eliminate delay and collapse the divide between a present, object city, and its appearance in the form of data. Simply put, real-time is understood to be *the time of what is real* (i.e., the time of what *is*). This is seen most clearly in the deluge of real-time maps and databases that accompany smart city projects. When Sidewalk Labs pitched a digitally connected community along the Toronto waterfront, for instance, real-time systems promised to provide local officials with updates (or “real-time feedback”) about traffic, weather, noise, pollution, waste, parks, public assets, and more (Sidewalk Labs 2019). In each case, references to real-time affirmed the immediacy with which information *about present conditions* would be captured and displayed, reflecting urban life as it happens.

 This sentiment is apparent in the reactivity that real-time technologies promise to provide. Real-time technologies promise more dynamic, responsive, and personalized forms of governance, condensing information and action into what de Lange (2018) calls the “perpetual present.” Within this perpetual present, decision-making is reframed as a matter of instinctual and ongoing reactivity to the here and now. This is seen most clearly in the collection of real-time technologies that promise to improve the management and flow of traffic within smart cities, with digitally connected streetlights, navigation apps, algorithmic traffic control programs, and increasingly autonomous vehicles all working together to manage shifting traffic conditions on the fly (Coletta and Kitchin 2016). More generally, Mckenna (1997, 3) writes that “almost all technology today is focused on compressing to zero the amount of time it takes to acquire and use information, to learn, to make decisions, to initiate action, to deploy resources, to innovate. When action and response are simultaneous, we are in real time.” We will return to this idea below.

 First and foremost, then, real-time technologies promise an immediate view of, and responsivity to, the present city. Real-time is thus associated with “present conditions,” promising unprecedented insight into the behaviour and needs of city residents (Kitchin 2017). Heim (1993) writes that real-time assumes “simultaneity in the occurrence and registering of an event,” with the immediacy of real-time technologies central to their value. The implication, of course, is that existing methods of inquiry provide insufficient access to the present, with potentially critical insights slipping through the cracks (i.e., the latencies) of existing systems. To that end, Harrison and Donnely (2011) describe access to “real-time information” as a matter of “making the invisible visible,” providing policymakers with a more comprehensive view of the present city.[[1]](#footnote-1)

 In addition to endorsing the apparent objectivity of digital systems, references to real-time also affirm the objectification of time itself. Time is treated as a series of linear and sequential presents capable of being measured, quantified, valued, and, perhaps most importantly, *saved.* From traffic managing technologies that promise to reduce commute times to machine learning algorithms that promise to make services like waste management more efficient, the speed and instantaneity offered by real-time technologies promises to reduce the *amount of time* that it takes to conduct certain activities within the city (Kitchin 2017; Kitchin 2023). The underlying assumption is that time itself proceeds linearly and predictably, as a finite resource that can be used, coordinated, and managed, and that risks being wasted without being appropriate intervention (Burges and Elias 2016; Hassan 2003). In this sense, enthusiasm for real-time assumes *the realness of time itself,* an empirical approach to time that affirms broader extractive and exploitative logics.

 Real-time technologies promise to save time in two important ways. First, real-time technologies are seen to compress and accelerate the pace of existing activities, with real-time systems *freeing* time from delay, congestion, and latency. They are marketed as a way to streamline service delivery and improve the efficiency of local governance (Coletta and Kitchin 2016; Kitchin 2023). For residents, the promise is of more time saved for leisure, socialization, and exploration, with time spent in traffic exchanged for time spent in a local park or café. Consistent is the idea that time is something *out there,* a measurable and finite resource that can be leveraged or exchanged more effectively using digital technologies. Returning to Sidewalk Labs’ work in Toronto, for instance, the company promised to “give people back” their time, a nod to the time supposedly wasted by the inefficiencies of contemporary cities (2017, 66).

 The second way that real-time technologies promise to save time is by making more time available through new forms of coordination and connectivity, creasing a seamless (and sleepless) urban experience. Real-time connectivity ensures that previously offline spaces such as the subway or local park can be brought online, while the responsivity of real-time infrastructures promises more flexible spaces and services that can accommodate the evolving needs of residents (Kitchin 2023). In this case, real-time technologies promise to facilitate what Crang (2007) calls “time-shifting,” in which previously unavailable time – down time – is brought online and made accessible. Wajcman (2008) writes similarly of the conversion of “dead” or “wasted” time into “productive time.” In addition to accelerating the pace of urban activity (i.e., doing more with less), real-time technologies thus promise the capacity to *do more with more.*

 In turn, real-time technologies promise to create what Kitchin (2017, 26) describes as “temporally flexible subjects,” for whom life is “more frenetic, fragmented, and lived in-the-moment.” Plans can be made and rearranged on the fly, informed by recommendations made to residents in real-time based on changing neighbourhood conditions. Real-time is not just a matter of speed, in this case, but of malleability and synchronicity, as well, with urban experience becoming more coordinated across a variety of digital platforms. Real-time systems thus promise a form of what Hassan (2003) calls “network time,” in which activity can be coordinated on the fly across expanding and complex geographies. To that end, Lupinacci (2022) suggests that the popularity of real-time reflects “a broader expectation of social coordination – a synchronization with the events of the world and experiences of others” (4). Kitchin (2017, 25) describes this as a type of “time-space distanciation,” with activities “re-organized across large time-space distances.” In this view, real-time technologies promise access to the entire present – or, alternatively, all that is present – with ubiquitous connectivity serving as a gateway towards ubiquitous knowledge.

 Enthusiasm for the speed and efficiency of real-time technologies reflects the predominance of capitalistic approaches to time within contemporary urban development, and the association of time with productivity (Sharma 2014). By suggesting that real-time technologies can eliminate delay, improve efficiency, and free time for other activities, proponents entrench longstanding divides between productive and unproductive time (West-Pavlov 2013; Kitchin 2014). In this way, appreciation for real-time can be thought of as a successor to clock-time, building on the organization of labour and capital that the advent of the clock enabled (Kitchin 2023; Milojević 2008; Adam 2004). As Kern (1983) contends, the invention of the clock encouraged the characterization of time as “universal and objective,” with units that can be labelled, differentiated, and prescribed value. To that end, clock-time has often been recruited according to the needs of contemporary capitalism, with time categorized as being either on or off the clock, for instance (Adam 2004). West-Pavlov (2013) write of the perceived competition “against the clock,” as well, and the impression that time is a finite resource that must be sliced and squeezed for value. Within the organizational logic of clock-time, speed and efficiency are directly connected to profitability, orientating governance towards the further expropriation of time itself (Tomlinson 2007).

 Whereas clock-time created firm divides between productive time and free time, allowing businesses to monopolize time deemed ‘on the clock,’ the connectivity promised by real-time technologies threatens to erode this dive entirely, rendering *all* time available to production. Indeed, while vendors emphasize the flexibility their technologies will provide, Sadowski (2020) argues that the consequences of temporal flexibility have been and will continue to be mixed. Instead of committing more time to leisure, many are working longer hours, working from home, checking emails on their commute, and so on. McCarroll and Cugurullo (2022) suggest that these trends will be exacerbated by investments in autonomous vehicles, with hands-free commutes creating more time for additional work. Strengers and Nicholls (2018) argue that improved connectivity has worsened gendered divisions of labour, with women often required to complete domestic labour while answering work calls for finishing assignments (a trend that was made apparent by the Covid-19 pandemic and the gendered dynamics that came to characterize remote work). To that end, Kitchin (2023, 42) writes that “acceleration does not necessarily lead… to an increase in free time, as any additional time produced can be colonized by other activities.”

 While the invention of the clock allowed for the ordering of time in terms of hours, minutes, milliseconds, and the like, the real-time city threatens to exchange these discrete units of time for something more seamless, totalizing, and connected. Residents are made “always-everywhere available,” capable of being reached, nudged, or disciplined for the sake of optimization and efficiency (Kitchin 2017, 25). There is thus no division of remainder in the real-time city, with present – which is to say object – time captured completely beneath a web of fluid and ubiquitous connectivity. Enthusiasm for real-time is thus the most recent in a long line of efforts that suggest “metaphysics and capitalist economy are in unmistakable collusion,” underpinned as they are by the measurement, categorization, and valuation of time as such (Marder 2011).

 Finally, the presumed timelessness of real-time systems serves to affirm the impartiality and transcendentality of real-time decision-making, painting real-time technologies as disembodied adjudicators capable of actualizing calculative truths that would otherwise remain opaque. In this sense, real-time technologies promise computation and decision without the exteriorization and temporalization decried by metaphysics – a technology freed from the embedded contingencies associated with specific times and places. Lastly, then, real-time promises to be *no time (or space) at all.*

 Around the world, cities are investing in technologies that promise to manage, rearrange, and optimize urban life. Placing such decisions under the purview of digital technologies is seen as a way to overcome the delays, desynchronization, and heuristics that can arise from more traditional forms of governance (Kitchin 2023). In many cases, real-time technologies are explicitly contrasted with the inefficiency of existing processes, which are condemned for being too far removed from the immediate needs of the urban environment (Green 2019; Sadowski 2020). Real-time is thus framed as being beyond the capacity of human actors, whose embeddedness *in* time (and the need to *take* time) serve as valuable contrast for the technologies offering to overcome temporal restraint (Kitchin 2017).

 This apparent immediacy reinforces the belief that real-time systems can improve the efficiency, impartiality, and optimality of local decision-making. In fact, the perceived immediacy of real-time technologies downplays the element of decision in general, framing real-time as a matter of *pure* response and reactivity freed from the contingencies, biases, and heuristics of embodied actors (Kitchin 2017; Kitchin 2023). The value of real-time technologies thus rests in their perceived ability to free decision-making from the restrictions and heuristics of local actors, facilitating what Kitchin (2017) calls “off the loop” automation. The implication is that real-time technologies are more reliable and effective than existing forms of administration or service delivery, reducing urban governance to a state of calculation and optimization (Artyushina 2022).

There is thus a connection between real-time and what Virilio (1997, 10) calls “non-time” or, elsewhere “chronoscopic time,” with algorithmic technologies operating instantaneously upon the city without detour through decision, compromise, and, in a word, politics. Castells (1998) calls this “timeless time,” wherein traditional epistemic and deliberative frameworks are exchanged for ongoing forms of management and intervention that are “either instantaneous or without predictable sequencing.” Enthusiasm for real-time in turn encourages the transition towards what Virilio (2010) calls “accidental” forms of governance, whereby “the accident of real-time takes over from the event of the present tense of short durations” (60). Causal models and historic narratives – what Virilio (1997) calls “chronological time” – are exchanged for “chronoscopic time” in which systems and services are adjusted on the fly as conditions change. In this view, the value of real-time technologies is in their “annihilation of space and time to the point where life takes place within a perpetual present,’” with new developments managed and accommodated in an ongoing and seamless way (Kitchin 2023, 37).

 Enthusiasm for real-time therefore encourages a broader shift from data-based decision-making to what Chandler (2019) calls data-*driven* governance. As Chandler (2019) puts it:

Digital governance is increasingly developing through non-modern ontologies which construct the world through processes of emergence and highlight the development of new post-epistemological approaches that view correlation as a more reliable and more objective ‘empirical’ method than the extrapolations and predictions of causal analysis. (24)

In short, it does not matter why two or more variables might be related, only that the algorithms driving real-time technologies provide a more accurate and immediate understanding of the degree to which they are. Real-time data are in turn trusted to “speak for themselves,” with the presumed immediacy of real-time decision-making becoming shorthand for its legitimacy (Kitchin 2021, 28). Lupinacci (2022, 5) similarly contends that real-time is intrinsically understood to mean “right-time,” with new technologies managing urban spaces according to black box equations that are presumed to be immanent (and exclusive) to real-time systems. We thus return to the aforementioned thread running between information and knowledge, with real-time technologies reducing urban governance to a seemingly ‘post-political’ state of pure and rational information processing (Kitchin 2023; Artyushina 2022). In this context, the perceived immediacy of real-time technologies becomes justification for algorithmic forms of governance more generally (Artyushina 2023).

 In short, real-time systems are assumed to provide a more immediate view of urban life, to save time through the acceleration and connection of urban systems, and to liberate urban governance from the constraints and heuristics of local actors. In this sense, real-time as it appears in the smart city discourse is assumed to mean the time of what is present, the present time, and the transcendental omnipresence of a calculative rationality. In the final section, I explore what this means for the politics of the real-time city and the smart city movement.

**5.0 Politics of the Real-Time City**

 In Derrida’s view, laying claim to the present – to the things that are – is no small thing. Rather, the claim to present truths is imbued with a certain authority over the world and its happenings. In his lesser-known reflections on the death penalty, Derrida makes it clear just how far this authority over the present can be extended. “The concept of the death penalty,” he writes, “supposes that the state, judges, society, the bourreaux, and executioners… have master over *the time of life* of the condemned one and thus know how to calculate and produce, *in so called objective time,* the deadline to within a second… All these third parties are presumed to know, calculate, [and] operate *the time of death* (Derrida 2013). In this view, the ability to determine what *is* (i.e., the time of life) is implicitly connected to the determination of what *can* or *should* be (i.e., the time of death). In this section, I argue that the idealization of real-time affirms a similar connection between the types of knowledge most valued in the smart city discourse and the types of interests and behaviours that are privileged (or punished) in smart city development.

 For starters, the idealization of real-time places a premium on the firms and technologies perceived as capable of delivering such systems to cities. In the case of Sidewalk Toronto, for instance, Sidewalk Labs argued that it was uniquely qualified to deliver the types of responsive technologies needed to unlock “the eastern waterfront’s potential,” contrasting their immense resources and expertise with the limited capacities of Toronto’s beleaguered public sector (Sidewalk Labs 2019, 50; 62-63; Artyushina 2022). Indeed, Sidewalk Labs was most willing to acknowledge its parent company Alphabet when discussing its ability to develop and operate the complex digital systems that it proposed (and less willing when discussing the importance of privacy or restraint). Such references lent an apparent legitimacy to the company’s proposal, contrasting their resources and expertise with an austere public service for whom the real-time city would otherwise remain out of reach (McDonald and Wylie 2019).

 Sidewalk Labs’ claim to *know best* in turn contributed to the company’s push for increased control over the governance of the Sidewalk Toronto project. The real-time city, the company argued, could only be achieved through the revision of existing policy (Artyushina 2023). Regarding a proposal to replace noise and pollution bylaws with real-time monitoring and feedback systems, for instance, the company argued that “there is no way to set a global standard for innovation without meaningful change to outmoded regulation” (Sidewalk Labs 2017, 20). Artyushina (2023) notes the many supplementary organizations that Sidewalk Labs planned to create to manage Quayside, further eroding public regulation in favour of an innovative governance model spearheaded by those with the resources and expertise required to access the real-time city. As McBride (2019) explains, Sidewalk Labs “suggested that Toronto needed innovation, or more aggressively, to be innovated, and that [Toronto’s] cash-strapped, dysfunctional government wasn’t up to the task.”

 The connection between knowledge and decision-making is not exclusive to Sidewalk Toronto, of course. The capacity to monitor in real-time is increasingly connected to the ability and authority to *respond* in real-time, with investments in real-time infrastructures concentrating decision-making power in the hands of state actors and, increasingly, their private sector partners (Kitchin 2023; Datta 2015; Wylie 2019). Cugurullo et al. (2023) note the growing role of urban artificial intelligence in governing urban systems, for instance, and the high levels of trust that are being placed in automated, ostensibly real-time systems. For Sadowski (2020), this represents a “fundamental shift” in urban sovereignty, “as technology companies move beyond treating the city merely as a place to extract value from and start thinking of it as also a space to exercise dominion over.” Others argue that enthusiasm for autonomous, real-time systems is encouraging a shift from disciplinary and panoptic forms of governance towards more direct intervention and control, with real-time technologies evaluating and nudging residents towards desired outcomes based on their performance within predetermined parameters (Krivý 2018). As Zuboff (2019) puts it, “the ability to know gives way to the power to control,” with associations between real-time and knowledge casting private companies as the pioneers and prophets of progressive urbanism.

 All of this depends on the extension of surveillance and datafication in cities. As Kitchin (2017) explains, “real-time smart city systems produce the condition of continuous geosurveillance, in which spaces and individual mobility are monitored at fine-grained temporal and spatial scales, enabling a detailed tracking and tracing of people, objects, transactions, and interactions…” This hunger is baked into the assumption that real-time technologies would help the city unlock its dormant potential, and that the instantaneity of real-time technologies will be supplemented by their ubiquity. In turn, residents’ engagement in the real-time city is reduced to their participation in these datafying systems. Kitchin (2021, 127) describes this as the reorientation of urban governance towards “the quantified self,” whereby residents are considered and accounted for according to their appearance within (real-time) data streams.

 As a result, embedded and local knowledges find themselves subverted in favour of technocratic truths seen as the exclusive purview of the private sector and their data driven technologies. Local perspectives are subsumed “within political discourses of stewardship, technocracy, paternalism, and the market,” to be managed (and filtered) by those whose expertise and capital allows them to *know better* (Kitchin, Cardullo, and Di Feliciantonio 2018). Though companies often express an interest in local opinion, this enthusiasm is *necessary* patronizing since it is subordinated to the overarching belief that technologists, and the real-time data they procure, are essential to addressing the challenges that cities face. To that end, Jirón, Imilan, and Osterling (2022) note similarities between smart urbanism and the evangelical efforts that have accompanied colonial efforts in Latin America, wherein ideas deemed superior to local knowledge practices are forwarded with limited opportunity for contestation. The capacity to provide digital infrastructure is, in this view, a way to “save” the city, with technologists “preaching the words of technology to an undomesticated group of people” (Jirón et al. 2022).

 In sum, the equation of real-time with knowledge and progress contributes to an exclusionary politics, wherein those with the resources and expertise necessary to design, develop, and deliver real-time systems are privileged. The result, as Virilio (1997, 19) says, is a “tyranny of real-time,” in which the pursuit of real-time comes to predominate urban life and urban development. While efforts are made to engage with residents, these attempts are often piecemeal and highly controlled, filtering feedback away from the underlying impetus of the project itself. This objectification of urban life through datafication has important consequences for those who find themselves excluded from the data, as well, or whose identities and experiences cannot be accommodated by the categories prescribed (Zuboff 2019; Mackinnon, Burns, and Fast 2022).

**6.0 Conclusion**

 This paper has explored the meaning and value of real-time as it appears in the smart city discourse. Reflecting on associations between real-time, presence, and urban technology, I argued that the meaning of real-time is threefold. First, real-time is imagined to be *the time of what is real,* affirming the idea that real-time systems provide a more immediate and objective account of urban life. Second, references to real-time affirm the realness (i.e., objectivity) of time itself, framing time as a resource that can be quantified and parsed for value. Third, and finally, I argued that real-time is understood to be *no time at all,* affirming the ethereal and transcendental character of new technologies.

 The result is an exclusionary and hierarchical politics, in which those with the resources and expertise needed to access ostensibly real-time systems are increasingly responsible for city governance. In the case of Sidewalk Toronto, for instance, Sidewalk Labs leveraged the reputation of their parent company, Alphabet, to legitimize their vision for the Toronto waterfront. In turn, local knowledge practices are subsumed by networks of datafication and control, in which residents’ perspectives are valued only to the extent that they can be accommodated within the privileged datasets of real-time technologies. The idealization of real-time thus risks affirming broader patterns of uneven development both within and between cities.

 This paper has dealt with the real-time city largely on its own terms, which is to say that the claims made *about* real-time have been explored but not critiqued. A growing body of literature, however, has called attention to the complex rhythms that persist beneath the surface of ostensibly real-time systems (Kitchin 2023; Olmstead 2021; Wajcman 2018; Coleman 2020; Coleman 2018; Coletta and Kitchin 2016; Datta 2020; Lupinacci 2022; Weltevrede, Helmond, and Gerlitz 2014). This research suggests an underlying disconnect between the promise of the real-time city and the way time is lived and experienced within the city, between real-time and what Hoy (2004) calls *temporality.* There is an accordant need for future research to explore the relationship between the temporalities that characterize digital infrastructure development and the mythic status of real-time among smart city proponents. It is a dissonance that suggests real-time is, at best, a misnomer and, at worst, a deliberate effort to distract from the contingencies and ideologies that guide the development of our increasingly digital communities.

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1. Such ideas are baked into many of the other words used to describe real-time systems. Even the word ‘data,’ for instance, is merely Latin for *that which is given* (Loukissas 2019). Zuboff (2019) similarly traces the word ‘render’ to the French verb *render,* meaning “to give back, present, yield” (223). In both cases, datafication – and real-time data especially – is framed as the opening of a significatory space within which the object city can present itself, revealing itself for both inspection and judgment. To that end, enthusiasm for real-time affirms the more general sentiment that the present pre-exists its measurement, and that data are “benign, objective, and non-ideological in character, *reflecting the world as it is*” (Kitchin 2021, 23). [↑](#footnote-ref-1)