

Smart cities: Who cares?

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Abstract

The growing critical research agenda on smart cities and open data programs has largely overlooked the body-subjects that enable its (re)production. The “ideal” subject of the smart city is prefigured as tech-savvy, independent, and uber-modern, able to produce digital data and analyze it to hold city government “accountable.” In this subject production, however, we argue that smart cities continue to rely on forms of reproductive labor that are invisibilized in current research and public discourse: We focus here on unpaid domestic labor, low-paid caring and reproductive labor, and volunteer work. We introduce the term “digital care worker” to capture a new category of reproductive worker in the smart city—voluntary and low-paid data producers and analyzers such as those who undertake “hackathons,” usually expected to do so out of love for their cities and communities. Drawing on geographies of care and Eve Sedgwick’s notion of the “closet,” we argue that the invisibility of digital caring laborers exists in dialectic relation to the spectacularization of particular body-subjects charged with caring for the smart city. Drawing on a discourse analysis of promotional materials and mission statements of key open data advocacy organizations, we propose the idea of “marginalized coder incubators,” who deploy assimilationist rhetoric to spectacularize the voluntary labor of women, people of color, and LGBTQ communities that is ultimately performed for the benefit of elites in the neoliberalizing city.

Keywords

Smart cities, open data, subjectivity, geographies of care, queer theory

Introduction

Despite the near ubiquity and increasingly global character of the smart city movement, the bodies and subjectivities on which it fundamentally relies are surprisingly inconspicuous.

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While there are many competing—and even conflicting—definitions of smart cities, they are generally understood to be the integration of digital technologies into the urban fabric for purposes of planning and administration (Kitchin et al., 2016). In the smart city, volunteer open data analysts are overshadowed by entrepreneurial app developers; childcare and domestic labor-enabling datathons and late-night policy drafting are eclipsed by technological-utopian visioning; and those on the less fortunate side of the digital divide are sidelined by those with means and access to innovative infrastructure and service delivery. Critical scholars increasingly interrogate the new social and political geographies of smart cities, yet few have turned this attention to the ways in which smart cities incorporate and rearticulate “proper” modes of being in a smart city. This development raises important new questions regarding the types of subjectivities and bodies that are visible in smart city discourses (both academic and promotional), the terms on which the marginalized bodies of the smart city attain visibility or are spectacularized (Sedgwick, 1990), and the longstanding caring economies that enable the smart city. As feminist scholars have long reminded us, the invisibilized labor of women and people of color has always subtended the capitalist city (Sassen, 1996), the labor of domestic life sometimes being occluded by forms of spectacularization such as the cult of motherhood (Kemp, 1994). Continuities in capitalist urbanization suggest that this reproductive labor may continue to be invisibilized in its latest iteration, the smart city, including through a new type, the “digital caring laborer,” that performs smart city analytics as a form of “loving service” to the city. What sort of reading is needed to trace and conceptualize these breaks and continuities?

These considerations arise in the context of open data figuring as a key tactic, or strategy, for achieving “smartness” (Hielkema and Hongisto, 2013; Roche, 2014). Open data programs are not the same thing as smart cities, but as Barns (2016: 556) argues, “the definitions of the smart city are now shifting to include open data as a central theme.” Open data are generally understood to be machine-readable datasets available to anybody free of charge, usually pertaining to city functions or events such as road networks or vehicle collisions. Open data have in recent years come to be associated with claims to increased transparency and public accountability exemplified by broader trends in “open governance” (Yu and Robinson, 2011); this “accountability” and “transparency” is, according to proponents, achieved through hackathons, datathons, and related initiatives that enroll skilled laypeople to analyze, manipulate, and visualize data, and sometimes develop new software to do so (Irani, 2015; Schrock, 2016).

Urbanists, geographers, sociologists, information scientists, and others have recently developed robust critical research around smart cities and open data. This literature orients around issues of shifted forms and practices of governance; the increased and fluctuating roles of capital accumulation imperatives; the bolstering of visual and realist epistemologies; and the uneven proliferation, benefits, drawbacks, and implications of smart technologies. This growing chorus of critical scholars has cast a far less critical gaze upon open data. Open data are theorized as part of a new neoliberal mode of citizenship (see, for example, Barns, 2016; Irani, 2015), and are largely beyond critical purview otherwise. Here, then, we advance these conversations by pointing to the overlooked dimension of the discursive production of caring, laboring bodies within smart cities, and within open data specifically.¹

In this article, we argue that the functioning smart city, as emerging through open data programs, relies on body-subjects that exist in an in/visibility dialectic that at once marginalizes the labor of women and people of color, and spectacularizes them in recognition of that very invisibility. The invisibility of these body-subjects occurs in promotional and marketing materials describing and defining smart cities around the world, but it occurs as well in theorizations of the smart city. More specifically, we begin from the standpoint,

well-established in the cognate literature that we discuss below, that city functions anticipate at least three kinds of digital and caring labor that elude most current smart city conceptualizations: unpaid domestic labor, low-paid caring and reproductive labor outside the home, and voluntary sector laborers. We scrutinize the same omission in research on the proliferation of open data platforms and citizen dashboards within smart cities. We make sense of this omission, as it extends into smart cities, through a combined analytical lens of geographies of care and Eve Sedgwick's (1990) theory of "the closet," which enables us to turn our attention to the interdependent, in/visible, dialectical relationships of "smart city" life and the actors written out of them. We trace this through a discussion of organizations we call "marginalized coder incubators," like Lesbians Who Tech, and juxtapose this analysis alongside a critical approach to paeans to "diversity in tech" in the media that serve to continue to obfuscate the voluntary and low-wage labor on which the smart city depends. This includes the labor of digital care workers *as well as* other unpaid and low-paid care workers who continue to reproduce the city as "livable" for the digital/creative elite. By drawing attention to this dialectic of body-subject in/visibility, our hope is that future research will cast critical attention to the systems of labor—and the body-subject positions within them—that underwrite the smart city; in other words, our intervention here is primarily of a conceptual nature.

In our argument, we are limited by the overwhelming geographic concentration of smart city research conducted in the Global North—itself an illuminating pattern. The context of calls for attention to the "actually existing smart city" has done little to reformulate smart city theory through Global South empirics and epistemologies, with some notable exceptions for India (see Datta, 2019), Rio de Janeiro (see Gaffney and Robertson, 2016), and scattered miscellaneous regions (see Watson, 2014). Our evidence and argumentation reflects these geographic patterns of knowledge production, a shortcoming we reflexively encourage future research to consider. This theoretical imperative is grounded in empirical concerns for the oft-majority female smart city engineers (of various sorts) in many regions, particularly in China, Japan, and India. Even while Sennett (2012) argues that smart city initiatives should internalize and indeed enable messiness and unplanned urbanity outside formal development intentions, we contend for the above reasons that this messiness already exists in the conceptual apparatuses urbanists use to understand smart cities.

The "who" of smart cities

A hallmark of globalizing and neoliberalizing contemporary urban life is the connection drawn between technology, entrepreneurialism, and "proper" modes of citizenship (Irani, 2015; Ong, 2006). This association is perhaps most strongly exemplified in smart cities, in which subjects are prefigured as technologically savvy, independent, and uber-modern (Barns, 2016; Datta, 2015). These subjects produce data through smartphones and social media, and make decisions and interact with the world informed through technologically mediated networks, information communications technology (ICT), apps, and analytics software (Graham and Zook, 2013). These subjects are usually described in terms of the massive amounts of data being produced to constitute what Rabari and Storper (2015) call the "digital skin" of the city (Figure 1). In Figure 1, an advertisement for Sierra Leone's Smart Mobile, telecom-related icons are assembled to represent a literal body, signifying an embodied digitality, a dissolution of the boundary between ICTs and the self. Beyond the scale of the body, a city's digital skin is saturated with sensors, with internet-connected devices, and with responsive environments. These produce datasets that are usually *about* individuals and groups in cities, but they just as often rely on those individuals and groups



Figure 1. Bodies are central to smart cities discourses, often oblivious to the physical bodies enabling its functioning.

Source: Nancy Odendaal (used with permission).

holding RFID (radio-frequency identification) chips and related networked hardware (Townsend, 2013), technical knowledge and skills to convert data into business-led profit (Hollands, 2008), and high levels of “social and relational capital” (Caragliu et al., 2011). Sieber and Johnson (2015) see governments, through open data initiatives, working toward these overarching goals along four lines: first, by releasing datasets to the public in open platforms; second, promoting open data usage in hackathons and app contests; third, by collecting feedback—data—from the public in crowdsourcing platforms; and fourth, participatory data coproduction. Underlying this new coming-together of urban space and data flows are claims of increased government transparency and accountability, improved public-sector resource distribution efficiency, heightened economic innovation, and more widespread public participation (Kitchin, 2013).

In any reasonable sense of the terms, these claims to transparency and accountability invoke a subject who will participate in the various tasks imagined in the open data movement. In related research, this imagined subject has been characterized as a quintessentially neoliberal subject, insofar as the purposes of hackathons, entrepreneurial governance, and open government initiatives is to responsabilize and governmentalize (Ho, 2016; Irani, 2015; Perng et al., 2017). This subject does not exist a priori the smart city, but is instead invoked by it in promotional materials, policy documents, new/s media, images of control centers, and social networks. In Figure 2, for instance, the subject is prefigured as able to use and to benefit from smart technologies across three primary application areas, each with more specific smart programs tailored to them. In other words, these spaces, as agents in the production of smart subjectivities, represent the intended and indeed “proper” ways of interacting with one’s environment (Foucault, 1982), thus specifically producing subjects who are shrewd, and who engage digital technologies to inform their decision-making



Figure 2. IBM's smart cities illustrative graphic, a performative visualization of "smartness."
Source: www.ibm.com/smarterplanet/us/en/smarter_cities/overview (accessed January 16, 2019).

(Vanolo, 2014), enforced within a web of citizenship practices largely framed through environmental mechanisms of control (Gabrys, 2014). For example, Vanolo (2014: 893) pulls three quotes from smart city promotional materials:

- "The primary goal of the Bari Smart City is to inform, involve and mobilise the community, residents, associations and public and private organisations, in order to develop an effective action plan in co-operation with the European Commission."
- "Follow our tips to get SMART. Reducing energy consumption in the home and the workplace benefits the environment and your wallet."
- "To build a smart city, we need citizens capable of inventing a new world."²

In each of these quotations, the advertisers imagine a future constructed through citizens engaging the urban milieu with real-time sensors, digital communication platforms, and entrepreneurial imaginaries. Within smart city discourses, an individual performs their civic duty by making use of the range of technologies and data now made available to them.

This Foucauldian approach to smart city subjectivation posits a new configuration of urban governance. That is, the smart city prefigures a techno-citizen in order to reify modes of control over—and through—that individual or those populations (Sadowski and Pasquale, 2015). This subject thus constitutes a new locus of power relations between the state, private corporations, the individual, and the social formations of which one is a part (Shelton and Lodato, 2019). Importantly, this assemblage that materializes the subject includes nonhuman actors as well, such as sensors, urban benchmarks, and citizen dashboards (Kitchin et al., 2015). Here, the mode of governmentality, or self-governance, is construed as the subject producing, analyzing, visualizing, and acting on *data* as a mode of responsible citizenship. The subject is responsabilized with enacting these data practices, often entailing claims that doing so holds the state "accountable" and increases governance

“transparency” (Gray, 2014). Existing research has typically examined this subjectification to elucidate the interests its formation serves, such as capital accumulation (Greenfield, 2013; Hollands, 2015; Söderström et al., 2014), social control (Amoore, 2011), and policy projections and mobilities (Bunnell and Das, 2010; White, 2016).

In this paper we take a complementary tack to this body of scholarship, which too often effectively assumes a singular individuated process of subjectivation as the origin for a theorization of the smart city, and overlooks a variety of subjects whose lionization often goes unremarked, in tandem with those that are written out of such dominant discourses. We argue that in smart cities these forms of subjectivation happen through the ideology of open data platforms that increasingly serve as a core tactic for achieving “smartness” (Barns, 2016; Rabari and Storper, 2015). In the ways open data platforms have been conceptualized above, their use implies *someone*—presumably a citizen or resident of the open data’s coverage area—will engage. In some cases they will download, analyze, and visualize the data; in other cases they will leverage open data to produce apps and real-time information delivery; they will report instances of graffiti or potholes on city platforms; or they will collaborate within the participation framework usually established by the city.³ As we explore later, the absences of these “some-bodies” from smart cities theory is rooted in a much older system of urban in/visibilities.

We want to ask *who* is expected to conduct these analyses and visualizations, under what terms, and for whose benefit? Proponents might answer the first part with “anyone,” as if datasets are always equally accessible, understandable, and leverageable for political power; but as we have mentioned, substantively leveraging the potentials of open data requires at a fundamental level a skill set and level of political capital largely beyond the reach of the general public. Of course, in response to the second, we have long understood that software, data models, and other forms of technology embody a form of politics that makes some means of action and use more viable than others (Winner, 1985). Central here is the notion that political projects not only conjure ideal subjectivities, but ideal bodies (Andrucki, 2017a), as well as subjectivities and bodies whose existence is considered abject or even threatening. In this paper we explore the tensions around the types of body-subjects (Crossley, 1996) whose labor is obscured and those whose labor is spectacularized.

In her recent work, Gillian Rose (2017) argues that the risk of insufficiently theorized understanding of the post-human in digital cities leads to an inevitable relapse into humanism in which “this human becomes an apparently unmarked cipher: the site of undifferentiated ideas, experience, and resistance... [But] such ciphers of the human are very rarely unmarked. Instead, they are most often coded as masculine, white, and straight” (p. 783). For Rose, theorizing agencies in the digital city necessitates challenging assumptions about digital city subjectivities that fail to take race and gender seriously and how “digital and urban inequalities are mutually constituted” (Gilbert, 2010: 1001). As Gregory Donovan (2020: 2) argues, we need a “politics of reading whom, what, and where is rendered both legible and illegible through smart urbanism.” These approaches are further supported by Elwood and Leszczynski’s (2018) recent call for greater engagement of queer and feminist theory and methods within the growing field of digital geographies.

Theorizing digital caring labor

In this section we draw on feminist work on care and social reproduction, and queer theories of invisibility—specifically, Sedgwick’s (1990) notion of the “closet”—to make clear that this form of smart city laboring that subtends urban life is obscured and yet intermittently, as Sedgwick would say, spectacularized. The lens of care focuses our attention on the relations

among people and collectives rather than on “independent” and siloed individuals (Cox, 2010). McDowell (2004), in particular, has argued that theories of care can destabilize the normative vision of the competitive individual participating in neoliberal labor markets; this normative vision, like smart cities discourses, tends to marginalize caregivers and other forms of labor devalued in late capitalist labor relations. We concur with Tronto (1994: 104) that care “consumes much of human activity” as a “practice . . . aimed at maintaining, continuing, or repairing the world,” and thus is in most actions relying on interrelations. Our borrowing from this body of work thus forms and comprises an explicitly *ethical* consideration for researchers and urbanists who produce the symbols and materials framing everyday lives (de la Bellacasa, 2017).

Smart cities rely on multiple types of laboring body-subjects identified in feminist research, and here we focus on three that are particularly salient for our analysis. These body-subjects, sufficiently theorized elsewhere in the literature we identify below, tend to *continue to* elude most current smart city conceptualizations: unpaid domestic laborers, low-paid caring and reproductive workers, and the oft-celebrated voluntary sector laborers responsabilized with tending to the disorder of capitalist urbanism.⁴ *These categories are neither mutually exclusive nor exhaustive*; nonetheless, drawing smart city researchers’ attention to them illuminates processes of in/visibility relevant to the smart city. As Laslett and Brenner (1989) have shown, by the 19th century, the “separate spheres” doctrine had defined the performance of domestic labor as central to what it meant to be a woman. In the 20th century, socialist feminists began to identify the extent to which women’s unpaid labor subtends capitalist urbanization through the institution of the breadwinner wage (James and Dalla Costa, 1972). In Britain (McDowell, 1983) and North America (England, 1991; Ilcan et al., 2007), feminist geographers began tracing the ways in which women’s domestic responsibilities inhibited their access to urban space and chronicled the partial deprivatization and revanchist reprivatization of social-reproductive functions in cities (Marston et al., 2003). Second, feminists have articulated the ways in which women, and in particular women of color, have consistently provided low-paid caring and reproductive labor services such as child care, food preparation, sex work, cleaning, and home health services both within and outside the home (e.g., Davis, 1993; Pratt, 2012). This provision of commodified reproductive services is shot through with relations of power, particularly around the very embodied nature of caring acts, and its eminently racialized, gendered, classed, emotional, and sexualized dimensions (Bondi, 2008; Staeheli and Brown, 2003). Third, scholars have shown how white women as well as women of color individually and collectively provide, and are relied upon to provide, the kinds of public voluntary labor that have always been essential for disciplining the disorder of capitalist urbanization (Naples, 1992; Spain, 2001); they have become more acutely necessary in contexts in which neoliberalization has encompassed a rollback of state provision of services like park maintenance or trash clean-up and a concomitant ideology of responsabilization of individuals and communities (e.g., Venkatesh, 2009). Andrucki (2017b) makes clear the discursive and material modes through which gay men act as important urban caretakers in US and other cities. This category can also include the many forms of support individuals and collectives offer each other (England, 2010; McEwan and Goodman, 2010). Across these categories of body-subjects, geographers in particular call attention to the spaces through which caring economies are organized, and their implications for embodied and subjective experience (Henry, 2018; Trudeau and Cope, 2003).

This marginality, however, exists in dialectical relation to processes of visibility. Pioneering queer theorist Eve Kosofsky Sedgwick (1990) famously posited the “closet,” a kind of open secret, as the primary structure that defined queer life in 20th-century America

(and in many ways continues to do so). She argued that the closet wielded its power because “categories presented in a culture” tend to be organized “as symmetrical binary oppositions” (p. 9) that, while seemingly simple, “actually subsist in a more unsettled and dynamic tacit relation according to which . . . the ontologically valorized term A actually depends for its meaning on the simultaneous subsumption and exclusion of term B” (p. 10). The closet not only regulates the binary of straight and gay, however; as Sedgwick notes, “‘Closetedness’ itself is a performance initiated as such by the speech act of a silence” (p. 3). There is thus a simultaneously crucial yet obscured mutually constitutive relationship between secretiveness and openness, between visibility and invisibility, that allows societies to function while the contradictions that might undermine them are apparent but studiously ignored. A wide variety of scholars have attended to the multiple ways this dialectic of in/visibility functions, especially highlighting the often overlooked perils of visibility for subaltern subjects. In particular, Annamarie Jagose (2002) fleshes out this binary by arguing that struggles for lesbian visibility constitute a paradoxical response to the problem of lesbian invisibility, in that lesbianism itself, when it has been made visible, for instance in popular media, has primarily been represented as invisible. In her discussion of migrant women in the Netherlands, Ghorashi (2010) suggests that state policies to foster women’s visibility have in fact contributed to further marginalization because they frame women as operating on the basis of a cultural lack. Nagel and Staeheli (2008) note that in an unpredictably Islamophobic context, their British Arab research participants must perform a complex negotiation of visibility and invisibility, “contesting and submerging what they feel to be negative images while projecting alternative, positive images” (p. 92). Similarly, Casey (2013) argues that gay men and lesbians in Newcastle consciously deploy alternating practices of assimilation alongside more radical political strategies in ways that call into question a discrete typology of queer spaces of “the ordinary” and those of “spectacle” (p. 153).

Considering the complexities of in/visibilities is central to thinking about care and the labor of care. These relations and unpaid labor inputs maintain and sustain life (Lawson, 2009), but, as Alice Kemp (1994) has famously noted, they have been systematically “degraded and devalued” through a range of ideological processes of invisibilization. Simultaneously, however, the cult of motherhood and the construction of women as “natural” caregivers who do so out of love has provided, paradoxically, a particular kind of visibility to this labor that masks its own devaluation.

These ideas map in messy ways onto in/visibility in the smart city, but in its data practices one can read all three forms of labor described above. Richardson (2018) rightly notes that digital technologies have reshaped the boundaries of the workplace in ways that render some bodies invisible—in particular, those of digitally laboring women. The proliferation of smartphone “apps” that provide social-reproductive services constitutes an extreme form of invisibilization of reproductive labor in the digital city. The promotion of these apps not only figures an idealized smart city worker—one who works long hours and “rationally” forgoes allocating time to “low-value” reproductive labor (Figure 3)—but also fetishistically constitutes the app itself as a kind of post-human agent that delivers the service, rather than the bodies of service workers. This process can be seen in apps like GrubHub, Seamless, and SkipTheDishes, wherein the app user requests a third-party user—a contracted worker for the app company—to pick up and deliver a meal from a local restaurant. Figure 3, a photo of an advertisement in the New York City subway, demonstrates how these processes are marketed and the ways in which such labor enters into the awareness of subway riders. Unpaid reproductive and domestic labor like cooking and cleaning is made to disappear from the app user’s life as the user outsources the work



Figure 3. Smart technology programs exemplified in SkipTheDishes, Foodora, Uber Eats, and Zomato explicitly proffer offshoring cooking labor to contingent contractors. This photo, of an advertisement in the New York City subway, epitomizes this point.

Source: Photo by Author.

of, for instance, meal preparation to the restaurant, and of retrieving and delivering the meal to a low-paid and mostly invisible delivery person. It is not even necessary to speak on the telephone to anyone performing or even organizing that labor. Digital urban practices have in this case intensified the invisibilization of social-reproductive labor to an extreme, even while the pervasiveness of advertisements for this category of apps spectacularizes this invisibilization as they plaster subway cars and billboards throughout the urban world. Together, then, the smart city invisibilizes unpaid reproductive domestic labor such as cooking and cleaning (the first form we identified earlier), and the low-paid labor such as the delivery of goods and services (the second form we identified earlier).

These feminist literatures require us to acknowledge that care workers' presence and activities do not "support" the city, smart or otherwise, in a passive, secondary role; rather, they are fundamental to the functioning of its social reproduction and political economy. As we have noted, smart cities discourses, specifically paeans to public open datasets, rely on the unreflexive invocation of the generally voluntary or voluntary sector labor necessary to process and make sense of it, an invocation that we also argue materially and discursively constitutes a new, and newly elided, form of "caring labor" for the city. This constitutes the third form of invisibilized labor we identified earlier. In addition, smart cities discourses continue to invisibilize those who are in fact essential to their material functioning: workers, disproportionately women and people of color, who perform the low-paid reproductive services we described above for high-income knowledge workers. Yet, we argue, the discursive elision of both of these forms of smart city caring labor must be understood as operating in binary opposition with, and as subtending, a concomitant set of emphases on the need to nurture and celebrate "diversity in tech" through the celebration of coders who are women and people of color, and who can be figured to do what we term "digital caring labor." This invisibility and hypervisibility compels us to argue that such gaps in both promotional materials constructing discourses around smart cities and current smart cities theories fail to acknowledge their own origins within particular political-economic norms, namely the imperative of neoliberalized cities to neglect and invisibilize voluntary and low-paid care and service work performed by certain kinds of body-subjects.

In this context we acknowledge a new category of in/visibilized caring laborers that the smart city conjures when relying on some-*body* to produce, analyze, and act upon data. Observing open data and smart cities' claims to openness, transparency, and accountability, we adapt what Terranova (2014) calls "free labor" into "digital caring labor" of the smart city. In most accounts of it, this is someone who goes unpaid for this digital labor, and in fact in some cases may pay for it themselves, shouldering the cost of data, services, and software. Others are paid by various entities to *produce* the smart city (through, for example, technical and knowledge work, and social reproduction labor described above). But there is also an expectation that volunteer and voluntary sector labor will be leveraged to actually make calculations, create maps, disseminate analytics results, and even interject into the political sphere to hold governments "accountable." They are expected to do this work out of love—for their city, for their communities, and so on. Examples include organization-led events such as Code for America, Codefest Marathon, and Random Hacks of Kindness, but also one-off events led by unorganized groups volunteers, often coordinated through Meetup.com.⁵ In such ways, these expectations synergize with broader governance shifts toward privatization, public-private partnerships, and the "third sector," in which private citizens are enrolled to conduct the work of the state (Adams, 2013). Thus, the predominant hype around transparency and related terms relies on expectations of unpaid labor. Within this umbrella process, certain kinds of bodies are imagined prominently and others are not. Like care work itself, this invocation of free labor is invisibilized through the way in which a universal subject—unmarked and thus assumed to be straight, white, and male—is imagined to perform work that is in fact performed by racialized, gendered, and queered body-subjects (England and Henry, 2013). This imaginary works simultaneously with the fact that the ability to provide unpaid digital caring labor is mediated by intersectional processes like gender (i.e., the association of technology, coding, and hackathons with masculinity), class (i.e., contributing unpaid labor necessarily entails foregoing paid labor), and race (i.e., the cultural associations between technical fields and racial stereotypes), among others.

Staging invisibility

In order to make sense of the above processes of in/visibility as they pertain to the smart city, we turn our attention to an emerging ecology of civil society groups we call "marginalized coder incubators" (MCIs). MCIs attempt to supplement the lack of diversity in the technology industry as well as provide visibility opportunities to body-subjects figured as peripheral to open data programs within the smart city. We demonstrate how MCIs nonetheless continue to figure the smart city care laborer as invisible through the spectacularization of her own invisibility. Indeed, it is through this particular form of spectacularization that these body-subjects' erstwhile invisibility becomes more starkly clear. In what follows, we draw on a discourse analysis (Jørgensen and Phillips, 2002) of promotional material and mission statements of organizations taking leading roles in emerging open data ecosystems, a small part of a much bigger, ongoing 4-year extended case method (Burawoy, 1998) and database ethnography (Schuurman, 2008) in Calgary, Alberta, Canada. The methods of the project as a whole are more precisely detailed elsewhere, but in short, the research project, while centered on Calgary, "follows" the digital traces of ideas through other places that have influenced Calgary's smart city and open data approach (Burns and Wark, 2019).⁶ This has contributed to our thinking a broad geographical framing and familiarity with a number of organizations. We focus on the specific organizations below because they provide particularly rich material for thinking through our theoretical propositions, and not because of an implied statistical sampling or coverage. As well, we

follow the lead set by our research subjects by collapsing the three forms of labor above; we do this because, as becomes clear below, the spectacularization process enrolls all three forms simultaneously, and the involved organizations themselves intertwine them in complex ways.

There is currently a growing plethora of MCIs associated with a diverse array of body-subjects imagined as marginal to the smart city: take, for example, the nonprofit Black Girls Code, or Women Who Code, or the Calgary, Alberta collection of initiatives that provide the following prefacing qualifications to their name “Learning Code”: “Women,” “Ladies,”⁷ “Kids,” “Teachers,” and “Canada.” The city of Seattle, an emerging tech hub of “innovation” and “entrepreneurialism,” is home to Native Girls Code, and has several active chapters of Women Who Code and Girls Who Code.⁸ These are each particularized versions of national-level parallels such as Code for America and Code for Canada. Girl Develop It has a new program bringing coding skills to incarcerated women,⁹ and Latina Girls Code encourages volunteers to provide mentoring services as well as donate hardware to young Latinas. In these spaces, as documented in our primary research and across the broader literature, volunteer-participants are given a dataset or an urban “problem” and tasked with generating “solutions,” such as data analyses or code libraries. While each of these organizations has their own target demographic and a unique approach toward reaching that demographic, they are connected through a common mandate. These initiatives seek to enroll the labor of particular bodies within the emergent form of neoliberal governance, often branded as “empowerment,” that is ultimately subsumed in claims to transparency and accountability. While many of these MCIs constitute a symptom of digital economies and the technology sector more broadly, we foreground them in our analysis because they figure particularly centrally to the re/production of the smart city vis-à-vis open data programs. In fact, we argue it is impossible to *think* the smart city without invoking such bodies and subjectivities. Our broader argument is that the actual beneficiaries of these programs, in the last instance, are those in positions privileged by entrenching neoliberal relations and governance.

Black Girls Code, for example, serves to spectacularize the bodies that are meant to care for the smart city through acts of code-a-thons, software development, and other technical interventions. A nonprofit organization partly funded through large philanthropic corporate donations from and partnerships with companies such as General Motors (Hilbring, 2017), the technology company Slack (Dickey, 2017a), and Colgate-Palmolive (Colgate-Palmolive, 2017),¹⁰ Black Girls Code works alongside private investment in a tech-saturated future. As Noble (2018) points out, Black Girls Code is meant to “fill the pipeline” of racial minorities into smart technology companies such as Google/Alphabet, IBM, and Socrata; however, its discursive work is in subjecting racialized bodies to neoliberal governance that “hold[s] ‘future’ Black women programmers responsible for solving the problems of racist exclusion and misrepresentation” (p. 65). In other words, as a smart city labor relation, Black Girls Code is the dialectically opposing force to the invisibilization of women of color from the smart city. As the organization’s founder Kimberly Bryant has said:

Black women have always been ideators and entrepreneurs. I believe the greater visibility currently is driven by access to the digital economies of scale and the proliferation of technology as a business tool . . . Since Black women are early adopters of technology and heavy consumers of it, there is a natural progression for us to harness these capabilities as both innovators and creators . . . [W]hat will be really exciting will be witnessing the expansion of Black women from small business owners to true industry icons utilizing the power of social media to connect. (www.essence.com/lifestyle/c2c/kimberly-bryant-on-tech)

In this quote, Bryant acknowledges a recent increase in black women's visibility within the sector, but ties it to a particular deepening of entrepreneurial logics. "Visibility," for her, occurs within an ideological reinscription of digital capitalist power relations that trades radical change for mere presence of people of color. At the same time, she factually recognizes the longstanding presence of black women in the sector, drawing attention to the fact that presence has not translated into the form of visibility she seeks. By extension, her organization's mandate is to siphon black women up corporate chains in order to show some black women that there are other black women within this space. Those corporations in turn benefit from being able to claim—with or without empirically observable grounding—buzzwords like "inclusion" and "diversity." This dialectic resolves not in a democratic integration of black women into the smart city, but instead a tokenistic gesture that placates their invisibilization while responsabilizing these bodies for the care of the smart city.

We read similar principles in an illustrative 2018 Canada Learning Code blog post that lauded the virtues of teaching code to Arabic-speaking elementary school-aged newcomers to Canada (Doucet-Roche, 2018). Here, marginalized, immigrant bodies navigate the in/visibility dialectic through a conflation of coding skills and citizenship. The post tells of a program whose struggles to build social connections between participants emerges from the participants' inability to attend regularly, their diverse levels of English fluency, and struggles finding stable housing. The narrator describes a sense of personal satisfaction they felt—indeed, they call it a "superpower"¹¹—when one participant, after explaining coding frustrations to another participant in Arabic, is able to overcome their coding struggles with the help of an interpreter and the narrator's expertise. The narrator then goes on to reify the organization's primary mission: "coding education is absolutely necessary for young Canadians to be prepared for the careers of the future" (Doucet-Roche, 2018; n.p.). With this discursive work in mind, it is perhaps not surprising that in 2018, 72.4% of the organization's revenue came from government grants, and another 19.2% from corporate contributions (Canada Learning Code, 2019). At the same time, this is not a unique situation, as such sentiments are echoed across the range of MCIs that we investigated and discuss here: a sense of (here, citizens') responsibility for their own and their communities' future, a prescription for digital technology to placate the ills of globalizing and racialized capitalism, a citizen-building outlook, and an imperative to bring invisibilized bodies into limited public discourse under conditions set by the MCI.¹² Take Girls Who Code, for example, who self-describe as "proud to be a part of this movement, and even prouder because our girls – girls of all races and ethnicities and abilities and zip codes – are leading it. They are solving problems in their communities, empowering their friends, and defining the future of our world."¹³ In short, such spaces instrumentalize open data and smart cities for "proper" subject production, by consciously placing them in relation to the state, processes of citizenship-building, and the digital. Through this configuration, the state spectacularizes particular bodies in the interest of claiming "empowerment," "integration," and, even more commonly, being held to "transparency" and "accountability" by these body-subjects.

Queer subjects are represented by a set of organizations including Out in Tech, TransTech Social Enterprises, and Lesbians Who Tech, whose mission statements explicitly traffic in the language of visibility. Lesbians Who Tech is "a community of queer women in or around tech" dedicated to two goals: "to be more visible to each other" and "to be more visible to others." As they write, "Outside of Ellen, Rosie, Melissa, and now Tammy [Baldwin, current two-term US senator from Wisconsin], what other mainstream lesbian role models can most people name? We need more examples of lesbian leaders and that means we need to come out as the amazing, successful people we are."¹⁴ Lesbians Who Tech, a registered for-profit company,¹⁵ also focuses its mission on the creation of

partnerships between tech-savvy digital caring laborers who can provide voluntary services for LGBTQ and women's organizations "who need our support." Lesbians Who Tech also offers an annual Edie Windsor Scholarship that pays for a gender-nonconforming or LGBTQ woman to attend coding school. Honoring the IBM programmer who was a respondent in the United States Supreme Court decision that struck down the Defense of Marriage Act, which prohibited the federal government from recognizing same-sex marriage, the name of the award hints at the ways in which the group embodies a set of contradictions through which a visibility project that prioritizes getting "more women and lesbians in technology" and providing caring labor for activist groups becomes paradoxically integrated into a mode of normative smart city subjectivation associated with a neoliberal politics of assimilation.

There are important overlaps between the MCI concept and the three forms of persistent in/visibilized labor we identified earlier, their invisibility made more salient by processes that blur the lines between paid and unpaid labor. First, typically, women in domestic spaces (i.e., not public) support male coders. Second, as Cockayne (2018: 76) shows, "often emotional and remunerated" labor takes place in the workplace when women are expected to carry out the social-reproductive work of building and maintaining morale, providing emotional and interpersonal support, and other forms of unaccounted-for labor. Third, as we have pointed out, smart cities depend on a large amount of reproductive work in the office, such as those in contracted cleaning positions (and thus not receiving corporate employee benefits), or those doing the cleaning in "clean-it-yourself" office spaces. Fourth, a hallmark of the digitally mediated smart city is its strong presence of "sharing economies"—or, rather, precarious contract workers leveraging personal capital in the ultimate service of the coordinating app developers and corporate managers (such as Uber, Lyft, SkipTheDishes, DoorDash, AirBnB, and others) (Richardson, 2015). These are indeed undermined by tropes of "caring" and "innovation." Fifth, "diversity" in large technology companies such as Apple often places bodies of color into low-paying retail spaces where their labor can be spectacularized for public consumption (Dickey, 2017b). Importantly, then, juxtaposing these forms of labor with MCIs illustrates the dialectical relation between labor, bodies, and subjectivities in the smart city.

Conclusion

We have argued here that both smart cities research and promotional materials produce a complex tension between multiple subjectivities, invisibilizing the caring and emotional labor that underwrite the urban, and on which smart cities in particular rely. These laborers provide services and labor that enable open data analyses, hackathons, and consumption economies, and are responsabilized to make sense of the vast sums of data smart cities produce and disseminate. Put simply, hackathons could not happen without someone emptying the trash, looking after the children for the day, sending an encouraging email, or putting in extra hours to establish the database, volunteering to analyze data, creating interactive websites for free, and editing hackathon promotional materials *pro bono*.

Drawing on Sedgwick's notion of the closet, we argue that this in/visibility operates as a dialectic that governs the smart city by, at strategic moments, spectacularizing those bodies marginalized from the smart city. We use "marginalized coder incubators" as a way of thinking through this spectacularization's effective mobilization of normative assimilationist politics. In other words, MCIs dovetail productively with the deepening neoliberal rationalities of contemporary cities. In this argumentation, importantly, we do not mean to condemn MCIs (they are not "bad"), as much as explore the forms of political participation,

deliberation, and in/visibilizing they make possible. A queer feminist reading of the hype of diversity in tech in smart cities uncovers a set of discursive processes that seem to recognize the problematic nature of straight white male centrality, but through this recognition continue to differently valorize various *forms* of labor practiced by bodies that are constructed as similar through their status as modes of embodied particularity always in dyadic relation to the universal of the straight white male body-subject.

The approach we have described necessitates that we ask some new questions, and some old questions in different ways. Who cares for the smart city? Who remains left out of smart city initiatives and scholarly engagements with them? What other forms of invisible labor enable the smart city, and by what mechanisms are they kept invisible? In whose interests are particular body-subjects permitted visibility? Or, at the most general level, for whom *is* the smart city? These questions promise to expand our understanding of smart cities and how they operate. Beyond its material form, the smart city is a rationality, or a way of knowing urbanism and assigning meaning to it. This rationality originates in attempts to generate a vision of the ideal city, which inflects differently across different spatial and temporal contexts. A care ethics framework necessitates that we critically and ruthlessly interrogate the ways the smart city rationality itself places important subjects within a dialectic of in/visibility.

What we propose is a smart cities research agenda that cares for the *subjects* and the *bodies* of smart cities. What might this look like? It would require three shifts. First, it would involve understanding the terms on which interdependency is queered. More research is needed to illuminate why, and how, caring economies and social reproduction remain largely absent from both promotional materials and scholarly engagements. Second, smart cities research must look at the new forms of restrictions, regulations, omissions, and variegations that emerge in the production of legitimate subjectivities. That is to say, urban studies scholars must pay attention to the implications of smart cities subject formation, largely—although not exclusively—by engaging with marginalized communities. Whereas much smart city research currently looks at actors in powerful positions, such as municipalities, the state, and corporations, we advocate here research with and for those at the bottom. We want to stress that although we have focused here on a singular form of subject production, Lynch (2019) rightly brings to our attention the ways digital technologies are often appropriated for counter-hegemonic social movements, adding some indeterminacy to our argument. Third, we implore urban studies to value the immaterial labor that sustains the smart city. This includes emotional labor, underpaid service workers, the body-subjects invoked by hackathons, and the like. We contend that this should provide a productive way forward.

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Notes

1. To be sure, there has been a significant amount of recent work contending with “smart citizenship”—the sanctioned and promoted modes of being in a smart city. These accounts most commonly draw upon Foucauldian notions of governmentality (Gabrys, 2014; Vanolo, 2014). For a review of this literature, see Shelton and Lodato (2019). While we find many commonalities with this growing body of work, here we depart from political-geographic concerns for the relation between the state and its subjects, and instead focus on the material, political-economic, and cultural-symbolic structures that produce body-subjects. As we explain later, to do this we draw less on the work of political geographers and more on feminist and queer theory.
2. Primary sources: www.barismartcity.it; www.torinosmartcity.csi.it; www.genovasmartcity.it. These were all accessed and translated by Vanolo in November 2012.
3. See Cardullo and Kitchin (2017) for a nuance of this last point about the hierarchical model of governance; while the term we use, “usually,” can be read as overly simplified, we use it primarily for illustrative purposes.
4. Saskia Sassen (1996: 206) provides a rich corollary to the figuration of laborers into globalization discourses and theories. We draw some inspiration in our argument from her exegesis of globalization theories: “Insofar as an economic analysis of the global city recovers the broad array of jobs and work cultures that are part of the global economy though typically not marked as such, I can examine the possibility of a new politics of traditionally disadvantaged actors operating in this new transnational economic geography – from factory workers in export-processing zones to cleaners on Wall Street.”
5. Code for America: www.codeforamerica.org/; Codefest Marathon: www.codefest.eu; Random Hacks of Kindness: <http://rhok.cc>.
6. The broader research project has conducted over 30 interviews, participated in dozens of community association and ad hoc task group meetings, facilitated “Data for Good” meetups, archived and analyzed news sources and policy documents for numerous Calgary smart city projects, and attended dozens of international smart city events.
7. In 2017, the Canada-wide umbrella organization Ladies Learning Code “rebranded” to become Canada Learning Code, offering a “Ladies Learning Code” program (Keith, 2017: n.p.).
8. Native Girls Code: www.naahillahee.org/ngc.html; Women Who Code: www.womenwhocode.com; Girls Who Code: <https://girlswhocode.com>. During the drafting of this article, many organizations changed their names and geographic bases, prompting us to reword this section several times. We suspect that by the time it reaches the press, many other reshuffles will have happened.
9. <http://citywidestories.com/2018/03/07/girl-develop-its-pilot-program-brings-coding-to-prison>.
10. With a conceptual harkening to deepening philanthro-capitalist relations (Jenkins, 2011), Colgate-Palmolive promoted their partnership with Black Girls Code by “donat[ing] \$1.00 (USD) to Black Girls CODE for every share or ‘Like’ of inspiring videos featuring Black Girls CODE participants across social platforms, including Facebook, Twitter, and Instagram” (Colgate-Palmolive, 2017: n.p.).
11. This is a term Kimberly Bryant, founder of Black Girls Code, also used to describe her organization’s collaborative methods: www.dailyprincetonian.com/article/2019/04/kimberlybryantq-a.
12. Underscoring the importance of this argument, Amazon announced in August 2018 a US\$525,000 donation to Canada Learning Code.
13. <https://girlswhocode.com/about-us> (last accessed January 17, 2019).

14. <https://lesbianswhotech.org/about> (last accessed June 22, 2018).
15. While most of Lesbians Who Tech's materials are vague on their business model, instead focusing on "community," it is clear that they are a for-profit business that relies on volunteered labor and large corporate sponsorships. See: www.crunchbase.com/organization/lesbians-who-tech and <https://lesbianswhotech.org/sanfrancisco2020/#Sponsors>.

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