17

PLATFORMS IN THE MAKING

Hacking the urban environment in Brazilian cities

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Introduction

This chapter unpacks a particular aspect of the emerging urban digital platform: the coming together of digital tools, digital/data activism and political asymmetries in both re-imagining and re-making the city's environment. Worldwide, the work of civic hackers, hackathons and other forms of data activism has eventually led to a range of city platforms—from municipal open data platforms to commercial and non-commercial applications (Luque-Ayala and Marvin, 2020). These platforms intervene in diverse urban issues, such as transport, public safety, citizen engagement and waste management. We argue that data activism and digital interventions prefigure urban platforms both materially and in terms of their political orientation. While not all digital platforms have roots in civic tech, we suggest that within practices of digital and data activism in cities there are always a range of *platforms in the making*.

We are particularly interested in forms of digital activism that seek to intervene in the broadly defined "urban environment" and the city's ecological flows (e.g. transport, energy, water, sanitation, waste and other infrastructures), as well as in the city's potential capacity for environmental stewardship and socio-ecological sustainability. These include hackathons, maker spaces, hacking collectives and other experimental efforts that, in the context of our study in large Brazilian cities, generated over five years more than 60 small-scale digital platforms and interventions aimed at urban ecological flows and socio-environmental issues. Our analysis suggests two critical findings. First, within the spaces of digital activism, both data and digital processes define how the city is to be understood and engaged with. Second, with few exceptions, there is a level of disconnect between the issues addressed by digital interventions and the long-standing issues, sites and stakeholders that, over the course of decades, have become a primary

focus for social and environmental activism within cities. This is a tension that we capture through establishing a distinction between "the digital as a form of activism" (data-led interventions) and "the digital as it encounters *pre-existing* forms of activism" (situated interventions).

Our empirical focus is on the global South, specifically Brazilian cities, where the unequal provision of urban services and infrastructures, profound asymmetries of power and growing socioeconomic gaps exacerbate the political tensions at the crossover of activism and the environment. We pay special attention to four cities with the greatest concentration of digital interventions on the urban environment: Rio de Janeiro, São Paulo, Recife and Porto Alegre. The analysis looks at the tensions and differences between data-led forms of activism drawn from digital and civic-tech practices and situated interventions involving traditional forms of activism learning to mobilise digital technology for their own political ends. We conclude with a case study of *data_labe*, a Rio de Janeiro-based collective mobilising data and digital tools to challenge urban exclusion and create new narratives about favelas. *data_labe*, we argue, illustrates the coming together of traditional forms of urban activism and digital/data-based interventions, and in doing so it exemplifies a situated intervention where digital practices and epistemologies encounter *pre-existing* forms of activism.

From digital activism to platform capitalism—and back!

Recent academic analyses of civic hacking and what is known within practitioner circles as the civic-tech community have emphasised their role as forms of data activism and advocacy (Schrock, 2016; Schrock and Shaffer, 2017; Luque-Ayala and Marvin, 2020). Civic hacking "has enriched the original meaning and purposes of "hacking", transforming itself into alternative place-making practices [… re-creating] urban governance, community engagement, and the meaning and practice of urban everyday life (Townsend, 2013)" (Perng and Kitchin, 2018: p. 2). Hacking, praised for its desire to challenge and transform the status quo (Wark, 2006), inevitably has implications for the political-economic order—often linked to a transformation in forms of production and the mechanisms for capital accumulation (Luque-Ayala and Marvin, 2020). For some, hackers are a separate social class with the ability to liberate information for the common good, bypassing capitalist forms of production and creating a new societal order (Wark, 2006). For others, a reading of hackers as a counter-class movement is both partial and short of idealistic given their entanglement with entrepreneurial logics and involvement with the corporate and business stakeholders advancing the digital economy (Luque-Ayala and Marvin, 2020).

Urban platforms are clearly connected to activist or civic tech movements. Many popular digital platforms are derived from the work of civic hackers and makers, or from the hackathons and civic tech events and communities often

sponsored by well-established platforms and digital economy business such as Amazon, eBay, Facebook and GitHub. Hackathons and civic hack nights are popular with aspiring start-up entrepreneurs as well as venture capitalists and have resulted in commercially successful urban platforms. For example, Roadify and Embark NYC are transit platforms that emerged from the NYC BigApps competition while SpotCrime.com is a security platform that emerged from Baltimore's civic tech scene. When used within a business model, these platforms can capture value within a process of capitalization—"valori[sing] potential for monopoly rents, [and prioritizing] up-scaling and the direct and/or indirect extraction rent from circulations and accompanying data trails" (Langley and Leyshon, 2017: p. 25). The popularity of collaboration between the business world, civic tech communities and entrepreneurial governance substantiates the view of urban platforms as mainly commercial products promoting platform capitalism (cf. Srnicek, 2017).

However, urban platforms can also act as forms of intermediation outside capital accumulation processes. Examining civic tech spaces reveals "platforms in the making"—both for-profit and not-for-profit, as well as both successes and failures. When digital interventions and platforms are appropriated, reassembled and redirected towards socio-environmental issues, they also allow the civic tech community to experiment with social engagement, citizen action and technopolitical agendas. Thus, digital interventions and platforms can also be framed as forms of activism in which civic tech practices allow "ordinary people" to use their skills to "change current political, social, and/or economic circumstances, policies, and values" (Takahashi, Kitchin and Thrift, 2009).

Thinking the city through data activism in four Brazilian cities

The empirical material for this chapter was collected via a web-based desktop review of seven cities in Brazil, where the popularity of the free and open-source software (FOSS) movement has shaped the civic tech community (Richter, Zo and Maruschke, 2009; Shaw, 2011; Leister and Frazier, 2014; Evangelista, 2018). We interrogated the Brazilian version of the Google search engine (google.com .br) against a pre-defined list of descriptors to identify civic tech community activities and digital interventions targeting urban socio-environmental issues and ecological flows. All sources in the review were posted between 2013 and 2018 and resulted in the identification of over 60 digital interventions in the following categories: hackathons, fablabs/maker spaces, academic initiatives, individual/private projects, hacking collectives; smartphone apps, and training workshops. Of the seven cities, four stood out by the number of initiatives or by their characteristics in terms of organised groups, project funding and connections to debates and topics linked to the urban environment: Rio de Janeiro, São Paulo, Recife and Porto Alegre (all state capitals within large metropolitan regions). The following pages describe the emerging landscape of digital interventions in each city, along with a brief description of their socio-environmental conditions.

Rio de Janeiro

Rio has over 6.7 million inhabitants and a unique topography that forces the majority of its population to live in narrow strips of land between its hills and the sea. The city's striking natural landscape makes it a sought-after location for global mega-events, such as the 2016 Olympics, the 2014 World Cup, and large United Nations conferences. Despite the significant investment and recognition brought by these events, Rio is often portrayed as an international exemplar of social and economic inequality that coexists with and reinforces pressing environmental challenges. For example, over 90% of the city's sewage is estimated to be released into the environment without any type of treatment (Instituto Trata Brasil, 2016). At the same time, the nearly 1.5 million people living in favelas face poor access to energy, water and transport infrastructures—a condition of inequality that is compounded by a persistent narrative that associates favelas with violence and crime (Ribeiro and Lago, 2001). In this context, issues of socio-environmental sustainability are often a forgotten topic.

Rio has also hosted a range of hackathons and civic tech events, many of which focus on mobilising data and digital tools to solve urban problems. In 2013 the municipality sponsored the Hackathon 1746, which became the first in a series of city-wide hackathons organised by different types of stakeholders. These hackathons culminated in the 2018 and 2019 Hacking.Rio events, the largest hackathons in Latin America. Common themes included promoting open data logics, advocating for the use of open data sets and open data platforms and encouraging technologies for transparency and accountability (a particular concern given Brazil's history of power and corruption). As is typical of hackathons, these were relatively fleeting events lasting only a few days. Maker spaces and FabLabs (fabrication laboratories), also popular in Rio, account for a set of digital interventions with greater permanence in the city. Several maker spaces and FabLabs have focused on minorities and urban peripheries (e.g. favela dwellers), following a narrative around the advancement of social transformation via technology.

The largest share (46%) of the digital interventions identified in Rio de Janeiro was associated primarily to either urban infrastructure or transparency/accountability topics with a smaller proportion targeting urban mobility, environment or sustainability and gender. Strikingly, digital interventions focused on issues of security, race or sanitation were largely absent in Rio.

São Paulo

São Paulo is Brazil's largest city, with 12 million inhabitants, and also its main centre of economic activity. Like Rio, the city experiences a broad range of environmental problems, including high levels of air pollution, water shortages and poor sanitation infrastructure. In 2013, a combination of severe drought and poor water management resulted in São Paulo's most serious environmental crisis in recent decades—the 2013 drought was considered the worst in recorded

history, leaving the state on the verge of water supply collapse (Martirani and Peres, 2016). City authorities are concerned with chronic water shortages, poor air quality linked to high levels of car ownership, river pollution and a shortage of landfill space. São Paulo has the highest prison population in Brazil and is the source of some of the country's most powerful organised crime groups, so violence and security have historically preoccupied city inhabitants and driven public policy.

As one of the most economically active cities in Latin America, São Paulo competes with Rio for the title of the largest technology hub in the region. In 2016, the majority of the city's creative enterprises focused on information technology and data, representing more than a third of the total number of businesses of this type nationally (Observatório de Sâo Paulo - DIEESE, 2016). City authorities have supported the development of FabLabs, and the city hosts a number of hacking collectives that work alongside digital start-ups to drive rapid growth within the city's digital economy. Digital interventions identified in São Paulo focused on cybersecurity, with fewer addressing environmental problems, transport and mobility.

Recife

With 1.6 million inhabitants, Recife is the most dynamic hub of economic activity of the Northeast of Brazil. The city is located at the confluence of the Capibaribe and the Beberibe rivers—a feature of cultural, economic and environmental importance. Known as the "mangrove town" because of the previously abundant ecosystems now replaced by urban settlements, Recife's land-use patterns have created long-standing ecological problems. Historical tensions over the city's delicate ecological configuration persist between real estate markets, planners, environmental activists and politicians. Despite strict legislation protecting valuable ecosystems, mangrove devastation has continued over the past decades as growing informal settlements mount pressure on the natural environment (Sobrinho and Andrade, 2011). Over 40% of informal settlements in Recife are in areas of floodplains, wetlands and mangroves, deteriorating the city's ecology but also affecting issues of drainage, sanitation and environmental comfort (Souza, 2012).

Recife is also well known within Brazil for innovation and creativity, with the *Porto Digital* (Digital Port) housing a considerable group of technology firms in the renovated historical downtown area. This public-private initiative was established in 2000 to transform the historic city centre into a "Brazilian Silicon Valley" hub of innovation and entrepreneurship. In partnership with the municipal informatics institute, the Digital Port supports the growth of civic-tech communities through "digital creative clusters", hacking events and more (Marques and Borba, 2017). Since 2013, the annual *Hacker Cidadão* (Citizen Hacker) event encourages civic hackers to use the municipality's open data portal to identify solutions to urban problems (Prefeitura de Recife, 2017; Gonçalves and Santos

da Gama, 2018). The majority of the identified digital interventions focused on mobility and transport, gender, transparency/accountability and health, with environmental issues playing only a minor role.

Porto Alegre

Comparable to Recife in size, Porto Alegre has an international reputation for innovative public management through citizen engagement (via, for example, participatory budgeting; see Célérier and Botey, 2015; Amaral and Carvalho, 2018). This reputation for transformative change was cemented through the city's leadership in establishing the World Social Forum, a counterpart to the World Economic Forum. Porto Alegre has become a symbol of Brazil's re-democratisation following the military dictatorship between 1964 and 1985, and a world reference for participatory democracy. Relative to other Brazilian cities, Porto Alegre has lower levels of social inequality (Sintomer, Röcke and Herzberg, 2016), although its high levels of industrialisation and agro-economy come with environmentally damaging practices such as the intense use of pesticides (Pasquetti et al., 2009).

Porto Alegre also hosts the annual International Free Software Forum (FISL), which is an important event for the global free and open-source software (FOSS) community. Partly as a result of this, the city has also nurtured a local community of civic technologists working on public issues. An early survey of the city's digital activism scene identified a substantive amount of work on urban issues, distributed over two broadly defined camps: those working on environmental issues and those focused on urban renovation, infrastructure and enterprise (Moraes, 2012). In contrast to the previous three cities, the primary focus of digital interventions identified in Porto Alegre addressed issues of social entrepreneurship, with the majority of initiatives being maker spaces or FabLabs (55%). Like in Recife, a large number of initiatives focus on urban mobility, transparency and accountability.

Distant dreams of digital activism

Figure 17.1 shows that nearly 70% of the identified interventions are either one-off events or inactive at the time of the survey, and that almost half (46%) are hackathons. Although ephemeral, the latter are understood to have the potential to generate entrepreneurship via platforms. Previous research on hackathons in global North contexts have identified the critical relevance of outcomes that "address place-specific needs" (Johnson and Robinson, 2014: p. 355); whether hackathons produce such results is inconclusive (ibid). Hackathons in Brazilian cities typically revolve around creating digital interventions to solve sectoral problems with the support of companies, universities and local governments. The typical participant conforms to civic hacker stereotypes: young, affluent, and male data enthusiasts[1], drawing on loose or weak institutional affiliations to work on public issues in the context of dedicated events or commissioned projects.

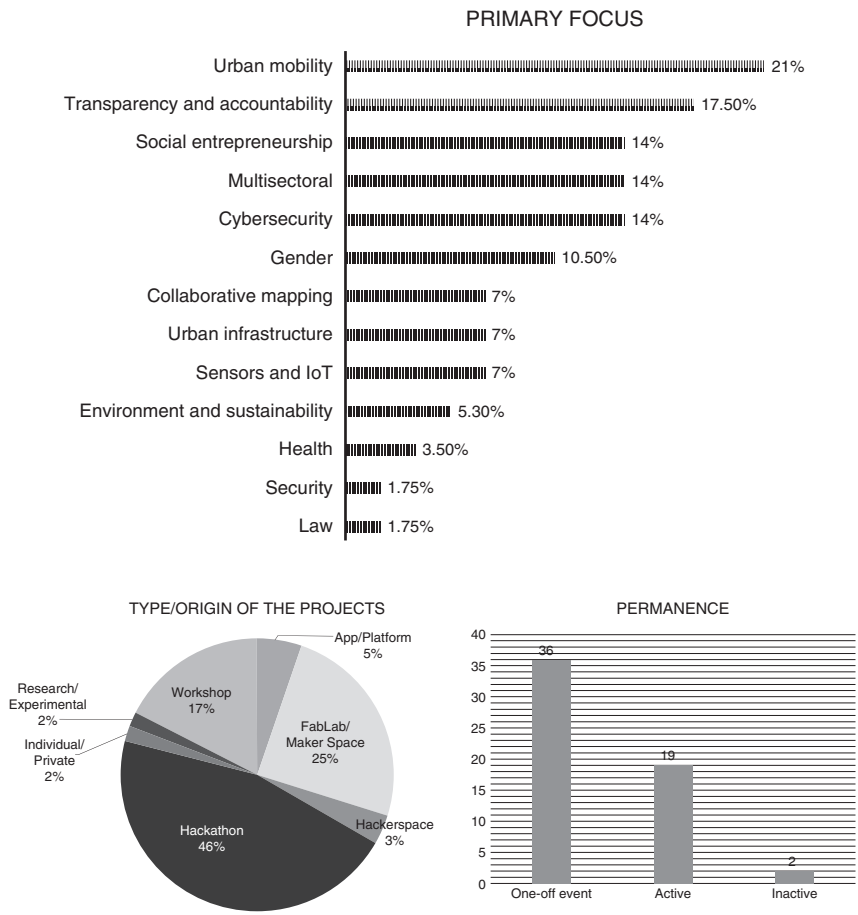

FIGURE 17.1 Combined results for all 57 cases in all 4 cities.
"Primary focus" shows the percentage of initiatives having each theme as one of their key foci. Thus, one single initiative can be counted on more than one topic simultaneously.

The focus of these corporate-driven hackathons is dominated by traditional themes, with urban mobility, transparency/accountability and social entrepreneurship among the most popular. Participant motivations were usually associated with product design, the mobilisation of data, and the development of digital tools to tackle narrowly defined problematics via short-term solutions. This favours an entrepreneurial approach to urban management (Barns, 2016) relying on a collective ability to perform data-based calculations and visualisations (Luque-Ayala and Marvin, 2020). The combined results of all four cities suggest a disconnect between the civic tech communities or digital interventions and the profound, challenging and historically grounded socio-environmental problematics within the conurbations. The actions of civic hackers and the civic tech

community, including data activism and advocacy for the open data movement, show "the digital as a form of activism" or what we term *data-led interventions*.

Digital encounters with pre-existing forms of activism

The data-led interventions above stand in contrast to "the digital as it encounters pre-existing forms of activism", or what we call *situated interventions*. The final section showcases the work of *data_labe* (www.datalabe.org)—a collective based, in the Northern area of Rio de Janeiro. *data_labe* illustrates the appropriation of digital technologies towards situated and pre-existing forms of urban activism. *data_labe* has arguably emerged as a situated urban platform that both challenges and transcends traditional epistemologies and political orientations associated with civic-tech domains.

Established in 2016, *data_labe* has three aims: technical and political training of favela residents in journalism and data science; the generation and distribution of content on several social media and digital platforms; and "citizen-generated data" or the primary collection of data for local issues. Its operations focus exclusively on the *Complexo da Maré*, a conglomerate of 16 favelas with more than 140,000 residents.[2] Maré has over 40,000 households in a variety of dwelling types, from informal settlements to social housing estates, illustrating the unevenly distributed public services and socio-economic factors characteristic of large Brazilian cities. Schools, healthcare, social services, basic sanitation and cultural facilities are present, but in numbers and quality far below those of other sectors of Rio. Like many other favelas in Rio, Maré is seen by the state as an unruly, lawless, needy and violent territory.

data_labe sees itself as "a laboratory of data and narratives". Its members are data-journalists and young favela inhabitants who experiment with ways "to make data visible, in order to safeguard new narratives that allow the development of communities and their rights".[3] The city's imaginaries, pervasive centre-periphery dichotomies (both in terms of subjects and territories) and the agency of its inhabitants all play a central role within *data_labe's* debates and projects. As an activist movement rooted within digital culture logics (Wright and McCarthy, 2004; Gere, 2009), *data_labe* uses conceptual and aesthetic references that promote encounters between technology, class consciousness, racial empowerment, public policy, human rights, horizontality and entrepreneurship. Projects developed by the organisation focus on diverse locally relevant topics ranging from gender, race and sexuality to sanitation, territory and technology. One recent project compares the 2014 and 2018 military occupations of Maré and looks at the differentiated role of state and federal governments—as seen through locally generated data on how the military interventions affected residents' perception of security. Other recent projects mobilise both data and narrative to report' on the everyday stigma and racism experienced by migrant Angolan communities, or on the experiences of young black HIV-positive residents of Rio—both of which challenge existing narratives by showing alternative data in support of appropriate public policies.[4]

FIGURE 17.2 CocôZap Hackathon at data_labe's workshop (December 2019), aimed at imagining ways of using data as a form of infrastructural activism around sanitation.

Source: The Authors.

One project with the potential to intervene in the environment and ecological flows of the city is *CocôZap*, a citizen-led database of sanitation problems in three favelas at Maré. *Cocô* is an informal Portuguese word for faeces and *Zap* is Brazilian slang for the WhatsApp messaging service. *CocôZap* is a reporting mechanism that operates via smartphones equipped with WhatsApp (Figure 17.2), allowing residents to provide details (including images and video) of recurrent sanitation issues like waste accumulation or sewage problems (Figure 17.3). The project allows *data_labe* to evidence, record and map unsanitary conditions in order to exert pressure on local authorities and to challenge official claims that 100% of Rio de Janeiro is served by waste collection services (SNIS, 2014). The data assembled in the *cocozap.datalabe.org* platform includes a digital map, photos, a Google Sheets spreadsheet and JavaScript APIs for anybody to download and use. Monthly meetings with residents, students, teachers, healthcare professionals and resident associations examine and discuss the data to promote debate on health and environmental issues. By coupling citizen data, WhatsApp, web-based platforms and social media, *data_labe* and partners[5] have opened channels for reporting problems, debating conditions, and proposing ideas around basic sanitation infrastructure in Maré.

CocôZap is one of several data-interventions developed in collaboration with communities within Maré—a move described by *data_labe* as a "peripheral data revolution". This recognises the emerging possibilities for engagement afforded by digital technologies and their assembly into urban platforms for those peripheral to political debates. Here data becomes a vehicle for disrupting and

FIGURE 17.3 Poor sanitation conditions in Maré, under a graffiti forbidding littering. *Source*: The Authors.

problematising the common narratives that dominate how favelas and peripheral areas of Rio de Janeiro are imagined and the ways in which the state responds. Within *data_labe*'s operations, juxtaposing the notion of "narrative" with that of "data" is important as it challenges the calculative epistemology of data. Meaningful information capable of affecting change, thus, can take a multiplicity of forms, both numeric and textual *data_labe* understands the production of data, the act of telling stories, and the practice of disputing access to data as political and cultural matters; by mobilising citizens to tell their own stories, as well as providing access to data as much as creating it, *data_labe* situates digital activism within the political and cultural agendas of poor communities in Rio.

Conclusions

Our survey revealed an active community of digital activists in Brazilian cities. From hackathons sponsored by municipal authorities and FabLabs working on digitally enabled devices to hacker collectives and academic research projects, many of these digital interventions use the city as a primary site for and topic of digital experimentation. The thematic focus of these interventions is broad and varied, although the extent to which they meaningfully target "place-specific needs" (cf. Johnson and Robinson, 2014) is inconclusive. In keeping with long-standing concerns within the civic-tech community worldwide, issues of transparency and accountability take a prominent role, followed by transport and mobility and by social entrepreneurship. Problems associated with urban ecological flows and natural environments are much less commonly tackled.

Our preliminary analysis has identified multiple disconnects between the issues addressed by civic tech community-driven and data-led digital interventions

and the issues and sites of greatest concern for social and environmental activists and suggests a twofold explanation. First, there is a significant geographic and demographic distance between those that participate in civic tech communities (university students, upper middle class professionals, predominantly white and male, living in middle-class neighbourhoods) and those most directly impacted by the problems targeted by traditional socio-environmental activism (often working class, low income, racially mixed, gender diverse and inhabiting the peripheral or informal urban spaces). Second, the activism envisioned within the civic tech community frames the urban environment in narrow and occasionally exclusionary ways by operating strictly through the data and digitalisation of urban processes (cf. (Luque-Ayala and Marvin, 2020). Effectively, these urban digital interventions can only access and act upon concerns through numeric data and processes of calculation.

Our analysis highlights the need to differentiate between digital activism that originates from within the city's civic-tech community and digital activism geographically and socio-politically grounded within traditional forms of urban activism. These "situated interventions" are llustrated through the *data_labe* collective in Rio de Janeiro, an organization that uses data and digital technologies as the primary tools for locally grounded political activism on issues of gender, race and the environment. Within *data_labe*, data reveals not only injustice and inequality, but also the state inaction in response to local concerns. Yet, data does not play a hegemonic role in imagining and advocating for a different city; *data_labe*'s operations always establish a—both productive and conflicting—dialogue between data and narrative; between objective evidence and a subjective truth. While both data-led and situated digital interventions generate urban politics, the politics they produce differ significantly. The former, exemplified by civic hackathons and their primary modus operandi via open data logics, data and digital process, seeks to remake the urban world through place-detached calculative epistemologies. In the latter, exemplified by urban activists asking for particular rights and improvements in living conditions associated with a specific territory, digital interventions are subservient to pre-existing socio-political struggles. These promote an engagement with digital technologies where the primacy of data and data-based epistemologies is challenged. Research leading to this chapter was supported by the British Academy project "Hacking the urban environment: smart cities and the role of civic hackers in remaking the city" (NAF2R\170051).

Notes

1 It is not surprising that most participants in hacker collectives and hackathons are white, young and upper-class males. Between 2000 and 2013 in Brazil, only 17% of computer science graduates were women (Maia, 2016) while most computer enthusiasts and those in the free and open-source-software movement (FOSS; a particularly active community of practice in Brazil; see Richter, Zo and Maruschke, 2009; Shaw, 2011; Takhteyev, 2012; Leister and Frazier, 2014) were men under 30 years old (Gilboa, 1996; Jordan and Taylor, 1998; Schell and Holt, 2009). Paz (2013)

and (Natansohn, 2013) argue that the 'digital gender division' is reinforced by a low female participation in such activities and the relatively few women leading software and digital system companies.

2 Maré is one of Rio de Janeiro's largest favela complexes. It was formally recognised as a neighbourhood in 1988 but dates back to the 1940s settlements associated with the construction of Avenida Brasil (Brazil Avenue), an important city thoroughfare.

3 From the original in Portuguese: "Como tornar os dados visíveis a ponto de garantir novas narrativas que permitam o desenvolvimento de comunidades plenas de direitos?" (http://datalabe.org/#narrativas).

4 The report celebrates the 2018 AIDS awareness month and was prepared by an HIV-positive young black resident following an invitation from *data_labe*.

5 *CocôZap* is supported by the Casa Fluminense, the Fundo Socioambiental Casa, Redes da Maré and other partners, including Durham University (UK) and the Pontifícia Universidade Católica do Paraná (Brazil).

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