Digital Territories:
Google Maps as a Political Technique
in the Re-making of Urban Informality

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Abstract

This article examines the mobilisation of spatial media technologies for digitally mapping informal settlements. It argues that digital mapping operates politically through a re-configuration of circulation, power, and territorial formations. Drawing on Stuart Elden's notion of territory as a "rendering of 'space' as a political category" (2010: 810), the coming together of digital mapping and the geoweb is uncovered as a political technique re-making territory through computational logics—operating as a calculative practice that, beyond simply representing space, is productive of the political spatiality that characterises territory. The article is based on an analysis of recent attempts by ICT corporates, particularly Google, to map favelas in Rio de Janeiro, Brazil, critically examining the claim that digitally mapping informal settlements is a mechanism for socio-economic inclusion. Providing a counterargument to claims around the power of digital maps to incorporate favelas, provide recognition, legitimacy, visibility and citizenship, we discuss how, in the interface between digital and urban worlds, territory as a political space is constructed through economic incorporation. In doing so, the article unpacks the spatial politics of digital and smart urbanisms, particularly in the context of the tension between inclusion and exclusion experienced by those who live in informal settlements in cities in the global South.

1. Introduction

This article examines the mobilisation of spatial media technologies for digitally mapping informal settlements as a mechanism for socio-economic inclusion. It examines how digital mapping, specifically a range of Google platforms, operates politically through a re-configuration of circulation, power, and territorial formations. Drawing on Stuart Elden's notion of territory as a "rendering of 'space' as a political category" (2010: 810), the coming together of digital mapping and the geoweb is uncovered as a political technique re-making territory through computational logics—operating as a calculative practice that, beyond simply representing space, is productive of the political spatiality that characterises territory. The digital map of the sites of urban informality puts in place new forms of territorial control that, while being governmental in that they operate through the freedoms and capacities of the governed (c.f. Foucault, 2009), also unsettle, transform and evolve into a new set of spatial sovereignties. In looking at this, the article unpacks the spatial politics of digital and smart urbanisms and their attempts to depoliticise territory, particularly in the context of the tension between inclusion and exclusion experienced by those who live in informal settlements in cities in the global South.

The article is based on an analysis of recent attempts by ICT corporates and non-profit organisations to re-imagine Rio de Janeiro and its informal settlements via digital engagements. It critically unpacks claims about the power of digital maps to incorporate favelas to the rest of the city, and about their capabilities to provide recognition, legitimacy, visibility and even citizenship to its inhabitants. Providing a counter-argument to such claims, we discuss how, in the interface between digital and urban worlds, territory as a political space is constructed through economic incorporation—advancing a configuration of spatial politics that is likely to increase in importance in years to come. In the context of Rio's favelas, often wrongly characterised as spaces beyond the sovereignty of the state, digital mapping advances a way of governing the urban through an opening to digital and material circulations that enable the incorporation of population into broader economic territories. The empirical focus of the article is Google Maps and its Rio-specific project *Ta no Mapa* (translated as It's on the Map), alongside other Google platforms such as Street View and My Business—a suite of technological tools rapidly defining how populations worldwide interact with and conceive space. The resulting urban geography, produced both materially and discursively *through* and *by* the digital, re-orders everyday life through new modes of knowledge production and the enactment of new forms of spatial regulation and control (Ash, Kitchin and Leszczynski, 2016; Kitchin and Dodge, 2011). In favelas, Google Maps establishes a way of governing through an opening to broader global and local circulations, whilst prioritising economic over social or political forms of inclusion. The article points to

the role of digital technologies in enabling a shift from the nation state to the multinational corporation, and the emergence of a form of power that relocates sovereignty with the agents who are fashioning global capital circulations.

Methodologically, the analysis draws on material collected via fieldwork in Rio de Janeiro between April 2015 and June 2016 as well as document analysis of a broad range of materials produced by those involved in *Ta no Mapa*. Fieldwork consisted of participatory observation, interviews and field visits to four of the 26 favelas where *Ta no Mapa* has presence (Cantagalo, Pavão-Pavãozinho, Santa Marta and Vidigal). The materials analysed both detail project operations and market the initiative. This includes seasonal project reports, press releases, promotional videos, web pages and an interactive web-based video documentary commissioned by Google. Following this introduction, the article is divided in four sections and a set of conclusions. Section two summarises relevant literatures on digital urbanism and the production of space, and provides a conceptualization of territory as a political technique operating through calculative processes—in this way opening possibilities for an understanding of the making of territory via digital processes. Section three introduces Google's *Ta no Mapa*, examining its claims of social inclusion and describing the process by which digital mapping aims to transform urban circulation. Section four focuses on the emphasis placed on economic circulations, and the mechanisms by which favelas, through digital mapping, are reimagined as a space of consumption. The final section analyses the on-going transformation of territory and its sovereignty by pointing to the tensions and changes associated to overlapping powers. The conclusions critically evaluate the claims around digitally mapping urban informality as a mechanism for social inclusion. They point to how the use of spatial media for digitally mapping favelas plays an active role in generating the favela itself, by making the favela into a seemingly depoliticised space of consumption and, through redirecting information flows, incorporating it into local and global markets. This complicates existing forms of sovereignty, as the type of calculative tools that in the past made up territory and enabled its control are now mobilised by the corporate sector—re-writing the code that rules territory, re-inventing ways of ordering space and re-defining social exclusion as economic exclusion.

An important global context to be considered in our analysis is provided by the extensive work on participatory mapping in informal settlements carried out worldwide by both practitioners and academics alike. Involving residents in mapping the sites of urban informality has been both used and portrayed as a meaningful vehicle towards a range of socially progressive goals. Participatory mapping, along with other forms of data collection referred to as 'community-led enumerations' (e.g. local censuses, data collection on living conditions and photographic records), has been seen as both a tool for political advocacy and a mechanism to achieve greater inclusion (McFarlane and Söderström, 2017; Livengood and

Kunte, 2012). Often aided by spatial media or other technological developments, participatory mapping is frequently supported by local organizations and federations of the urban poor. These calculative ways of knowing urban informality, it is argued, "can help to build a community, define a collective identity, facilitate development priority setting and provide a basis for engagement between communities and government on planning and development" (Patel et al., 2012: 13). They provide the basis for local planning and upgrade projects, and contribute towards securing tenure and fostering collective discussions around urban issues (Livengood and Kunte, 2012; Karanja, 2010). We identify a contrasting trend, defined by a greater involvement of ICT corporates (e.g. Google and Microsoft). This not only substantiates arguments around the corporatization of the urban via digital technologies (Söderström et al., 2014; Vanolo, 2014), but most importantly illustrates the enrolment of community-based agents and agencies in expanding the frontiers of capital accumulation through a digital reconfiguration of space.

Similarly, an understanding of informal settlements, or in this specific case, favelas, needs to be considered from the outset. In developing our argument we approach favelas not as silenced or excluded from the urban, but rather as operating visibly within the urban under a condition of exceptionality. In thinking about urban informality as a state of exception, informality is not out of state reach, but rather produced by the sovereign (Roy, 2005). Recognising the state of exception as uniquely determined by a sovereign power (Agamben, 2005), Ananya Roy points out that informality results from the suspension of law in a given time and space by a sovereign power: the state. Informality is not the chaos that precedes order, but rather the result of such suspension. Here, it is precisely the capacity to impose or suspend exception, as much as the ability to alter a condition of legitimacy or illegitimacy, which indicates a sovereign power at play. Roy's notion of urban informality as a state of exception underpins our argument, yet with an important variation: the mobilization of claims around who has the capacity to determine, enact or lift informality evidence a space of contestation, where the state is not the only power at play.

The redemptive claims of those digitally mapping favelas—around the provision of recognition, visibility, citizenship, and legitimacy—indicate points of tension between different agents asserting or enacting forms of sovereignty. Such claims are particularly salient in a nation that throughout the second part of the 20th century, following over 20 years of military dictatorship, struggled to achieve democracy; a nation where, in spite of democracy, police violence in favelas continued on the rise (Desmond Arias, 2006; Goldstein, 2013). The contemporary history of urban Brazil has been marked by the criminalization of poverty, with police violence playing a key role in maintaining normalised forms of exclusion (Garmany, 2014). Favelas, marked by a history of squatting and threats of forceful removal from the country's political elites, are the spatial expression of a 'differentiated citizenship'

that assigns rights, privileges and inequalities in unequal ways (Holston, 2008). This is also a type of "citizenship that manages social differences by legalising them in ways that legitimate and reproduce inequality" (Holston, 2008: 3-4; see also Wacquant, 2008). With both the state (via the police) and the underworld (via drug lords and criminal networks) operating though the power of death, favelas are an active site of contested sovereignties (c.f. Hansen and Stepputat, 2006), where the means through which power operates shift in consonance with political interests, economic configurations, and social arrangements.

2. Beyond smart environments: the digital calculation of territory

Digital productions: space, urban informality and spatial media

For over two decades, geography and allied disciplines have examined the digital production of space, evaluating the urban implications of new digital technologies and the ubiquity of ICT components. Digital technologies have been linked to an automatic production of space, where everyday life is mediated through code and software, "installing a new kind of automatically reproduced background" (Thrift and French, 2002). Uncovered as a sorting device, software in the city "separate[s] privileged and marginalized groups and places across a wide range of sectors and domains" (Graham, 2005: 562; see also Kitchin and Dodge, 2011). These 'sentient cities' that reflexively monitor our behaviour (Crang and Graham, 2007) can also advance surveillant, fragmented and uneven cities. In responding to the expansion of corporate narratives positioning ICT services as the key driver behind a techno-utopian model of—optimised, efficient, sustainable and real time—cities, scholars have called for a critical research agenda for smart urbanism (Luque-Ayala and Marvin, 2015). Embraced by public and private sectors alike, smart city discourses and techniques have been linked to a corporatization of the urban (Söderström et al., 2014; Vanolo, 2014) and to a re-making of citizenship into sensing capabilities (Gabrys, 2014). Underpinned by "neoliberal visions of market-led and technocratic solutions to city governance and development" (Kitchin et al., 2016: 16), the smart city, and the data that fuels its dreams, advances pronounced political transformations.

With digital urbanism encountering the global South, digital technologies have been mobilised "to count, map, survey and document life in informal settlements" (McFarlane and Söderström, 2017: 7). Increasingly, participatory mapping initiatives in informal settlements operate via the geoweb, using the Internet to assemble and circulate geographic information—in effect, rethinking urban informality through spatial media technologies. Like traditional participatory mapping of informal settlements, these projects start from the assumption that residents' lack of access to spatial information leaves them "disempowered

and unable to use information to solve problems" (Hagen, 2011: 70). In Nairobi's well-documented Map Kibera, for example, a digitally achieved location awareness is described as a form of 'community information empowerment'; a "resource that would harness [the community's] collective wisdom and intimate knowledge of Kibera, so they could become the drivers of development" (Hagen, 2011: 76). In the neighbouring informal settlement of Muhimu residents and foreign volunteers expect digital mapping to bring transparency and visibility towards political recognition (Poggiali, 2016). The resulting products are seen to offer "a unique opportunity to significantly improve the lives of the poor through an exploration of the best ways to link open information and deliberative development" (Donovan, 2012: 103).

Offering an alternative to the optimistic tone above, the literature on volunteered geographic information (VGI) provides clues for a critical analysis of the use of spatial media for mapping informal settlements. VGI refers to the volunteered dissemination via the Internet of user-generated content of a spatial nature (Elwood and Leszczynski, 2013; Haklay, 2010). Elwood et al. (2012), in considering VGI as social practice, ask questions that are of relevance for an understanding of the political implications of digital mapping in favelas: what knowledges are included or excluded from VGI practices, how socially and politically significant is this knowledge, and how is VGI transforming practices of representation and the very epistemological politics of geographic information. Critical research argues that VGI's "most important value... [lies] in what it can tell about local activities in various geographic locations that go unnoticed by the world's media, and about life at a local level" (Goodchild, 2007: 220). Therefore, the enrolment of spatial media in some form of 'voluntary' mappings of informal settlements is significant, as the emphasis changes from the representation of space to a purposeful attempt to share information in the everyday. Beyond traditional paper or GIS mapping, the use of spatial media and the geoweb combines "pervasiveness" and "ordinariness" in the spatial practices of everyday life; in an unprecedented manner, "coming-into-contact with spatial media is generative of spatiality" (Leszczynski, 2015: 746).

In developing our argument around the political implications of using spatial media technologies such as Google Maps in favelas, we draw specifically on the notion of territory, where an explicit intent to govern is foregrounded. Broadly used to "describe a particular and historically limited set of practices and ideas about the relation between place and power" (Elden, 2013a: 7), territory implies a combination of spatial and political conditions. Considering territory offers our understanding of digital urbanism—and specifically, of the use of spatial media in favelas—a particularly salient political angle, foregrounding the workings of power and the various ways of conducting conducts at play (c.f. Foucault, 2009). This is of relevance for the coming together of urban informality and the digital,

particularly given the multiplicity of (formal and informal) powers at play in favelas, and the extent to which these often signify the limits and failures, but most importantly exceptions and suspensions, of the state.

Making territory: digital mapping as a calculative technique

Political geographers, looking beyond the city, have provided insightful analyses on how territory gets imbricated in, and transformed through, digital technologies. Amoore's (2016) inquiry into territorial sovereignty and the cloud is concerned with the ways in which the digital puts in place new forms of perceiving and analysing the world. This understanding of the digital politics of territory is not limited to the bounded space of sovereign interventions (e.g. accessing or seeing data), an approach that attends to territorial jurisdiction rather than territory itself. Rather, a foregrounding of 'digital reasoning' transcends the politics of geographical location and, building on Elden's analysis of territory (2010), signals digital processes and the algorithm as "novel political space[s] of calculative reasoning" (Amoore 2016: 9)—a move that has implications for how the digital map plays a role in the very making of sovereign territory and, through this, a politics of space.

We use the concept of territory as a particular way of examining the relationship between digital urbanism, space and power. Territory is not a process exclusively associated with state power, but a broader (historical and geographical) category of political organization and political thought (Brenner and Elden, 2009). A reading of territory through an engagement with digital data networks and spatial media resonates with Painter's reconciliation of networked and territorial logics, where territory is the effect of networked relations; a work in progress, identified and claimed (Painter, 2010). Territory, beyond an ahistorical expression of state power, is an effect: both produced through socio-technical practices and the result of relational networks (Painter, 2010). But it is the work of Elden and Crampton that provides the key reference points for our argument. Elden refers to territory as the "rendering of 'space' as a political category: owned, distributed, mapped, calculated, bordered, and controlled" (2010: 810). Broadly seen as "the area controlled by a certain kind of power" (Foucault, cited in Elden, 2013a: 9), territory is "not simply an object", but rather a process, "made and remade, shaped and shaping, active and reactive" (Elden, 2013a: 17). Elden's understanding of territory aims to foreground its conceptual specificity: territory is different to land (an economic category denoting possession and use) or terrain (a narrow notion that evokes an intervention strategy). Privileging the coming together of legal and technical domains, territory is seen as a calculative political technique; "a bundle of political technologies… [made up of] techniques for measuring land and controlling terrain" (Elden, 2013b: 36), including statistics, censuses, cartography—and, thus, digital mapping. In this sense, territory can also be configured digitally. As Elden points out, drawing on Heidegger,

technology here does not simply aim to denote a practical application (e.g. geometry, land surveying, or, for that matter, digital coding and geotagging), but rather a way of conceiving the world; or what, in the context of digital urbanism, Marvin and Luque-Ayala (2017) have referred to as a 'computational logic' of the urban.

Bridging digital (i.e. computational) and spatial calculations (i.e. cartographic), territory is both the effect of particular calculative practices and a calculative technique that finds a practical expression in cartographic forms. Calculation, both numeric and spatial in orientation, emerges here as a territorial strategy involved in the production of space (Crampton, 2011). Through calculation, politics and mathematical thought come together, joining quantitative and qualitative dimensions whilst mobilising a rationality "through which space is made 'amenable to thought' (Osborne and Rose 2004: 212)" (Crampton and Elden, 2006: 681-682). The cartographic assessment of territory rests on the use of numbers, counting and arithmetic procedures, pointing to the map not as a matter of knowledge, meaning or representation, but of calculation (Crampton, 2011). Citing Hannah (2001), but also referencing Dodge et al.'s work on space and digital technologies, Crampton suggests three knowledges required for the calculative making of territory: "sociodemographic census data; geodemographic; and fleeting, transactional records (what Dodge et al., 2009, have called 'software-sorted space')" (2011: 95). It follows that the relevance of mapping for the making of territory does not lie in its ability to provide a visual representation, but rather in the coming together of space and the database (Crampton, 2011)—or, in the context of Google Maps, what matters is not so much the visual image of the map on a computer screen, but the databases and calculative possibilities associated to such visual representation.

3. Mapping favelas: re-calculating the 'point of interest'

Calculated cartographically, territory—in favelas and elsewhere—is inherently the effect of a form of computing. We argue that urban informality is experienced, actualised and re-constituted (spatially and politically) through its engagement with digital technologies—in this case, via Google Maps and the data points collected by those involved in *Ta No Mapa*. *Ta no Mapa* is one of a dozen projects of mapping favelas that have emerged in Rio over the last ten years. Involving residents in a variety of ways, often but not always through spatial media, these projects frame the act of mapping as a "first step" to exercise "the right to the city [through] visibility and recognition" (Redes de Desenvolvimento da Maré, 2012: 8). Mobilising an imaginary of historic invisibility, mapping is seen as a form of territorial recognition—"the recognition of a place inhabited by people and their lives" (Redes de Desenvolvimento da Maré, 2012: 13). Mapping favelas is also described as an opportunity for spatial re-signification and legitimacy, and even a chance for residents to rediscover a 'lost

identity' (Brasil 247, 2014). Often presented as a tool for the incorporation of the (arguably 'disconnected') favela with the rest of the city—a means "to integrate Rio as a unified city" (Instituto Pereira Passos, 2014)—, maps are seen as a mechanism for showcasing the positive side of favelas via empowering residents as the main actors in the process of producing cartographic information.

Technology companies, particularly Microsoft and Google, have played an important role in driving such processes, reproducing narratives that position the map as a tool of urban integration and social inclusion. Microsoft's *Na Área* (On the Area), developed in collaboration with the municipality of Rio, is described as "another step... to help integrate [these communities] to the rest of the city" (Microsoft, 2014). Google's *Ta no Mapa* claims that locating favelas on Google Maps will provide visibility whilst helping to overcome systematic exclusions. For *Ta no Mapa*, the absence of publicly available digital data is the source of "huge social and economic loss"—by consequence, it is claimed, the generation of geo-referenced data could help to reverse this situation (Google/AfroReggae, 2014a).

Ta no Mapa is the result of a partnership between Google and AfroReggae, a Rio-based arts and culture non-profit organization with over 20-years of community-based experience in favelas. The partnership is advertised as an effort to "turn these data free areas into data full zones… the most complete economical and behavioural data ever gathered on favelas has created a virtuous circle where everybody wins" (Google/AfroReggae, 2014). Putting favelas on the map, we are told, boosts the creative economy, community pride, self-esteem, identity, sense of belonging, and, in doing so, supports in "rescuing citizenship" (AfroReggae, 2014a). The legitimate existence of favelas' dwellers, their rightful presence in the city, is discursively tied to Google Maps. As described by a project coordinator from AfroReggae, the project's original initiator, the digital map is "where everyone is... it is a recognition that you exist... [that] you are not a white spot on the map, that you are not out of the city" (Interview, 2015). Using the marketing tagline 'Breaking the wall between the favela and the city', the project is described as a new form of digital visibility. The idea of a 'wall' separating city and favela does not only refer to a physical separation in space and a 'digital wall' resulting from an absence of data; it is also a "wall of prejudice" that separates favelas from both the city and the world (Google/AfroReggae, 2014a)—a claim that arguably locates in data, and through this Google, the improbable power of redressing historical wrongs by establishing the new informational shape of inclusion and equality.

As of 2016, *Ta no Mapa* had collected data on 26 of almost 1,000 favelas in Rio de Janeiro, including data on over 10,000 businesses. The mapping process, coordinated by AfroReggae, is carried out by mapping teams composed primarily of paid local residents (four to eight 'field agents') contracted specifically for this purpose. They work alongside an 'office agent'

based in the offices of AfroReggae, outside the favela. Field-agents work between two and four months, mapping between ten and fifteen 'points of interest' per day. Their work is sometimes interrupted by environmental risks (e.g. heavy rains, floods and landslides) or episodes of urban violence (e.g. disputes between gangs and police). They use the app Google Map Maker Mobile Buddy, installed on a smartphone supplied by Google, for capturing and georeferencing data. The app works exclusively in English, consolidating English as the neo-colonial language through which local and global domains come together. It comes with a set of pre-defined categories that restricts the types of features that can be mapped. Mapping a 'point of interest' starts with taking a photo. The GPS function of the smartphone tags the photo with the appropriate geographical coordinates and stores this information in the app. At the end of the day, the team uploads the information on the cloud, to be processed by the office agent on the Google Map Maker platform, thus opening points of connection with Google My Business (which creates business listings in Google Search) as well as other Google platforms. As part of processing the data, geotagged photos are cross-referenced against satellite images, and field agents are often called to pinpoint the exact location of any 'points of interest' that were not accurately georeferenced—at times, the smartphone's GPS fails to identify the correct location, particularly in favelas characterised by sharp topography and/or high building density. Once the map is completed, 'regional mediators' with knowledge and experience of Brazil and Rio de Janeiro (albeit not necessarily residents of favelas) and a technical team based in Google's EU headquarters in Dublin revise and upload the work. They are the final gatekeepers validating, rejecting, interpreting, translating and adapting local information to the Google Maps format, despite not being entirely familiar with the typical and idiosyncratic features of space in some favelas, such as different streets having the same name, or a same street having different names.

Participant observation at training workshops revealed the distance between the richness of the mental map of favela dwellers and the spatial simplification and standardization required by the global digital map. Participants frequently debated what a 'point of interest' was and what type of information was to be recorded. Their suggestions abound. Historic sites? Small business? Catholic churches? Umbanda temples? Recommendations for tourists on the fair price of a *moto-taxi* trip? Local infrastructure problems (such as an open sewer)? Or the symbolic landmarks of the collective memory of violence (such as the sites where memorable homicides occurred)? When a participant suggests that he would not map Umbanda temples, out of fear of prejudice, the project coordinator explains that for Google neither religion nor political orientation matters; in his view, what matters is to provide information, such as the location of *moto-taxis*, popcorn carts, football fields... a 'point of interest' is simply defined by him as "whatever is interesting!" Yet he recommends field-agents not to register where a homicide occurred, or local problems such as open ditches or fly tipping; rather, he recommends mapping business and touristic sights. Paraphrasing a field-agent

working on the project, dealing with trash dumps is not their responsibility but the government's; their mapping work is to show outsiders what a favela has: beauty salons, bakeries, dressmaker, etc.

It would be hard to say that this is either a form of participatory mapping or VGI. Space is made through foreign languages, eyes and hands; a spatial neocoloniality that aims to depoliticise space, translating the needs and means of the market but not necessarily those of local dwellers. Not only are favelas produced through this kind of mapping practices; it is done through a very particular form of cultural power and capital, which depoliticizes and pacifies core issues. In wanting to erase differences, the favela is produced as homogenous and coherent, which works to reify the very walls that the digital map is claiming to break down—both glossing over and appeasing problematic social conditions in the name of economic incorporation.

4. Beyond the map: opening the favela to consumption

The (digitally calculated) territory resulting from Google's mapping of favelas, both calculated and mediated through the means and practices associated to code, software, hardware, spatial media and other new technological objects and domains, is imbued with the rationalities of its human and material mediators. This includes not only the computational logics embedded in spatial media, but also the concerns and aspirations of Google as the informational corporation that promotes a reading of the world through digital forms of 'location awareness'. Previously, geographers have pointed out how in a neoliberal age, through its capacity to make everything calculable and monetizable, digital mapping has the power to open "new economic zones [to be] colonized for value extraction" (Crampton, 2017: 42). This section examines in more detail how the circulation of economic flows appears to be a central concern for *Ta no Mapa*.

In favelas and elsewhere, 'being on the map' is presented by Google as key to business prosperity. The company's business proposition transcends digital visibility (e.g. coordinate location on a digital map). Rather, Google's offer focuses on shaping circulation, movement and (commercial) decision making in the material world through various types of (digital) immersion. A digital understanding of 'location awareness', achieved through spatial media, becomes a pillar of how Google intends to support business decisions in the 'real-world'. Often described by Google with the notion of 'beyond the map', this is illustrated by the words of Jen Fitzpatrick, the San Francisco-based leader of the company's Google Maps and Local team:

> In a connected world, location awareness can fuel all sorts of new and fun ways to interact with the things in our physical surroundings. That gives you a very brief taste of some of the many ways that we are seeing businesses build really game-changing experiences for their customers on top of our data and insights about the world... In essence, we're helping businesses move beyond just visualizing the world, and helping them make major, real-world decisions. And at the center of it all is location, and this understanding of how the real world moves.
>
> (Fitzpatrick, 2016)

Google's location awareness operates through the development of digital and material relations outside the Google ecosystem itself. Specifically, through the ability to share locational and non-locational data, processes and calculations with other internet-enabled devices and software, including users' smartphones, computers and apps. As is the case with many other digital interactions, this occurs through APIs—Application Programming Interfaces, or the communication protocols between and across software components and operating systems. Google's Location Awareness APIs are provided to software developers beyond the Google ecosystem for the purpose of building "assistive and aware experiences... that bridge the physical and digital worlds... [and] simplify user interactions, provide assistance, and help users to better understand themselves" (Google Developers, n.d.). Like with other digital calculative processes (e.g. algorithms), critical scholarship on digital technologies have pointed to APIs as not neutral, but rather charged with a political agency resulting from the types of relationships they form and enable (Butcher, 2013).

Location awareness, in its Google incarnation, is a calculative spatiality that prioritises economic interactions. It takes material shape through a combination of three tools (Google Maps, local search capabilities and Google My Business), opening the possibility of a business-oriented spatial calculation via three processes. First, it provides a general sense of place and orientation. Second, it offers a targeted form of spatial knowledge around business transactions and/or forms of consumption. And third, it enables the incorporation of business locations and sites of consumption within an emerging and calculative sense of place. Google describes this as "an experience" occurring across local and global geographies that helps people "navigate, explore, and decide" (Fitzpatrick, 2016). It affords Google, as the owner of the ecosystem of platforms defining and providing location awareness, with a complex and particular type of power: governmental in its ability to conduct conducts, yet

with strong overlaps with the sovereign forces that shape the circulation of capital and the nature of the relationship between subjects and territory.

Building on *Ta no Mapa,* yet transcending its original scope, Google launched *Beyond the Map* in Rio de Janeiro in 2016. With it, Google brings its Street View initiative to favelas, prioritising the type of immersive experience that would operationalise Google's version of location awareness in the specific terrain of favelas. *Beyond the Map* is an interactive web-documentary that consists of eight interlinked 360° videos in Portuguese and English portraying life in favelas through the story of its inhabitants (see https://beyondthemap.withgoogle.com/en-us/). Foregrounding music, dance, sports, engagements with computers, and video games, favelas are portrayed as spaces full of life and creativity, where locals are working hard to make their dreams come true, and through this, "put themselves on the map" (Google, 2016: video 7/8). Aimed at those who live outside favelas, and inviting them to step in it for the first time, *Beyond the Map* intends to show how the favelas—"an unchartered and mysterious part of the map" (Google, 2016: intro)—are no longer a simple point-based representation in a digital map. "Favelas are not simply a place, they are a people. And to understand them, you must go inside and see for yourself" (Google, 2016: intro). In viewing favelas from the street level, viewers are invited to engage with the lives of those living there.

Beyond the Map, whilst mobilising a narrative around the historic 'invisibility' of favelas, positions both business and the digital as the new nature of urban inclusion and visibility. In a video segment titled *Change Starts with Hello*, Paloma, a favela resident, describes a bleak picture of everyday invisibility that demands a statement of presence: "The favela is a blank spot on the map. Mail doesn't get delivered. Correspondence neither. It's as if we didn't exist... This is a daily fight. We are saying that we are here, that we exist, that we are part of the city" (Google, 2016: video 2/8). Paloma shares with viewers the story of her life, her memories of favela violence, her fascination with computer programming, and her surprise at becoming the only computer science student from a favela at the Federal University of Rio de Janeiro. Invisibility is discursively constructed, so that it can be overcome via a digital presence. The web-documentary provides explicit linkages with *Ta no Mapa*; reproducing colonial narratives, it praises it as a project that "is somehow taking the favelas out of invisibility and throwing some light" (Google, 2016: video 8/8). This process of digitally mapping favelas is not simply described as a project about social inclusion, but rather as a form of economic inclusion. "We're trying to map the most possible favelas, but with a focus larger than only inclusion. Also to show business" (Google, 2016: video 8/8).

Ta no Mapa's marketing material introduces favelas in decisively quantitative terms, foregrounding economic potential: "13 million people live in Brasilian Favelas. Income in

those areas total 25 billion dollars" (Google/Afroreggae, 2014). The posters and leaflets inviting favela residents to get involved in the project target small enterprises, emphasising potential business benefits: “You are now on the map! Come for a breakfast and listen from experts to improve your business”. Mapping teams are instructed to be particularly amiable and enthusiastic when engaging with local business, "developing trust and conveying the importance of gaining Internet visibility for increasing sales" (Ta no Mapa, 2015a: 3). After mapping a particular business, field-agents encourage business owners to register in Google My Business, with the objective of "increasing the number of local entrepreneurs with global visibility" (Ta no Mapa, 2015b: 3). They agree that one of the main purposes of the initiative is to allow outsiders—mainly tourists—to come in and consume. As expressed by a project coordinator at a mapping training workshop, the digital map will be a valuable resource for outsiders "who want to come and stay in the favela… If there is no information, they won't know… we are putting [this information] on the most accessed map on the planet” (Interview, 2015). Yet, the sporadic media reports of tourists’ deaths resulting from following Google Maps (or the Google owned navigation system Waze) into favelas are a reminder of the risks associated to navigating the city with only limited local knowledge, and of an artificial digital flattening of space that removes conflict and politics.

This mapping of favelas illustrates how digital urbanism operates in governmental ways, creating and maintaining urban flows and circulations rather than simply imposing the disciplinary spaces of surveillance (Luque-Ayala and Marvin, 2016), something that is productive not only of subjects but also spaces (Leszczynski (2016). A detailed analysis of the extent to which this digital governmentality successfully comes to fruition through governing the conducts of those living within and outside favelas remains beyond the scope of this article. Yet, evidence collected by *Ta no Mapa* suggests that the digital map has impacted participating business. A survey of 27 entrepreneurs in the favela of Vidigal six months after the project concludes that half of participating business increased sales and customer visits, while one in four increased its number of employees; “almost all considered that mapped business have greater chances for growth” (JWT, 2015). This governmental form of power, particularly amenable to the consolidation of neoliberal rationalities in those spaces where global capital has limited penetration, is aimed at opening favelas to broader economic circulations. Yet, this is far from providing meaningful inclusion and/or citizenship. Our arguments resonate with Leszczynski (2016), for whom urban big data and its computational analytics can only reproduce existing urban fragmentations and socio-economic inequalities; the very materiality of the later persists beyond the digital intervention, and the only certainty projected into the future is the characteristic unevenness of the contemporary city. Digitally mapping favelas reproduces Rio’s pre-existing spatial unevenness, by focusing on favelas that are located within proximity of tourist areas and have a greater economic insertion in the city —in effect, prioritising the wealthiest favelas.

The experience of *Ta no Mapa* illustrates on-going efforts worldwide towards the economic incorporation of space through digital information flows. This economic incorporation is highly political, not so much because of the claims made around the affordance of citizenship via digital inclusion, or simply because of the specific form of political economy that is being advanced, but because of changes in the forms of sovereignty involved and the ways by which territory (in its political sense) is calculated. Reminding us that the cartographic effort has always served the interests of power (c.f. Harley, 1988), Leszczynski (2012) has already pointed to the geoweb as a site where neoliberal rationalities get embroiled in forms of governance. This entails a transformation in the relationship between citizens, the state, the private sector and markets, and demands a political-economic reading of the emerging nodes of power that generate and/or own either spatial information or the information technology platforms that enable its recombination. The role of digital mapping in advancing forms of economic incorporation of space has also been examined by Alvarez León (2016), for whom Google Maps is embroiled in processes of commodification, "transforming informational resources into market goods". However, his analysis of the digitization of spatial resources focuses on how information leads to new property regimes rather than on the ways in which *digitally calculated space* enters production and consumption circuits and *through this* puts in place new political orders. Our argument is more in tune with other works that link the economic dimensions of digital mapping with political transformations in space. Farman (2010: 876), for example, drawing on Hardt and Negri's (2000) and acknowledging that digital mapping "is inherently connected to the desire to map out a new territory", sees in the control and regulation of spatial information a new form of sovereignty—a digital empire. As such, this process upsets and deterritorializes traditional spatial forms such as the nation and the state, while redistributing functions, processes and powers traditionally in the hands of the state. The information-space created by *Ta no Mapa*, reconfiguring the favela both as digital territory and market, becomes the new terrain at stake in the search for security. The market, envisioned by Hansen and Stepputat in their analysis of contemporary sovereignties as an emerging configuration of power, unfolds as a "magical and redemptive" (yet potentially "unpredictable and pitiless") sovereign force (2006: 16.15). Its power this time enhanced by the calculative coming together of space and the digital database.

5. Favelas' overlapping powers: from 'pacified' to 'calculated'

Transcending a simplistic reading of mapping favelas, slums or other processes of urban informality as an unprecedented opportunity to support rights to the city for a long time

denied—social inclusion, urban integration, citizenship, identity and so on—, the recent global interest in producing and sharing spatial data about urban informality can be read as a broader political reconfiguration of the relationship between these processes and both state and city. Such reconfiguration both muddles and overlaps sovereign and governmental forms of power. In making the favela into a digitally searchable space, new forms of calculating territory are enrolled and new techniques for governing local economies and circulations mobilised. As part of such process, new sovereignties come into being whilst others recede. As examined in this section, the digital making of territory in favelas runs in tension with the non-digital shape of territorialization.

Favelas, already information spaces, have always been 'ripe for encoding' (c.f. Leszczynski, 2015). In contrasts to the narrative enacted by Google and its *Ta no Mapa* project, favelas in Rio have never been fully invisible nor at the margins. Defying invisibility, they have always been at the core of the city's economy and politics. If the empty and disconnected cartographic representation of favelas (or informal settlements, for that matter) is, for some, a measure of urban exclusion (Brillembourg and Klumpner, 2005; Gouverneur and Grauer, 2008; Reyes Novaes, 2014), for others it is an affirmative action of resistance to the colonizing practices of the state (Fabricius, 2008; Freeman, 2014; see also Varley, 2013). Often imagined either as a space of crime and poverty, or as a site of freedom and creativity, 'the favela'—a singular noun that evokes an unfounded spatial homogeneity—is also a historical and political invention (Valladares, 2005). For Reyes Novaes (2014) the exclusion of favelas from the map established a 'double discourse' that separates ungoverned subalterns and governed middle classes—a perspective that resonates with Holston's thesis of 'differentiated citizenship' (2008). Yet, the marked attention to cartographic silences—as either tools of knowledge, power and domination (c.f. Harley, 1988) or as a deliberate resistance to domination—is not only simplistic but also reifies a false dichotomy between formality and informality (Varley, 2013). Breaking through the limitations imposed by a representational reading of favelas (i.e. one that prioritizes invisibility over visibility), Perlman speaks of 'the myth of marginality': residents of favelas "are not economically and politically marginal, but are exploited, manipulated, and repressed… inexorably integrated into society, albeit in a manner detrimental to their own interests" (Perlman, 2005: 18). With over half a century of a clear spatial, social, economic and political presence in the city, favelas continue being the intense subject of political and economic intervention.

However, attempting to govern favelas through digital code stands in sharp contrast to the operations of the sovereign powers that have historically defined their territorial control and the nature of their urban integration. Many of Rio's favelas since the 1980s, particularly those located in hilly areas, have been controlled by militias and drug trafficking networks. These favelas provided local militia and the drug trade with favourable topographical and

political conditions for the positioning of informal powers. Squeezed against the hillsides, overlooking the city and its circulations, their tops proved to be a strategic location from where economic circulations could be overseen; their terrain, a maze of labyrinths and alleys enabling strategic blockages, hiding and escape; their boundaries, controlled borders limiting access and establishing separation with the formally governed territory. In 2008 the state government of Rio de Janeiro initiated its Pacifying Police Units program (UPPs, or *Unidades de Polícia Pacificadora*), a combination of military occupation, intense police presence and social services aimed at reclaiming favelas. UPPs aimed at breaking the territorial control exercised by militia and drug trafficking networks, and through this, reinstate the formal authority of the state whilst interrupting well-established cycles of urban violence. They represent the mobilisation of the sovereign power of the state to contest the sovereignty exercised by informal powers. UPPs have been highly criticized both as a form of zero-tolerance policing and a colonising intervention of the state exposing residents to the predatory aspects of capital (Swanson, 2013; Freeman, 2014). But they are also seen by many as a mechanism that has enabled public service delivery and economic integration (via businesses). Over eighty per cent of the favelas chosen by Google and AfroReggae for digital mapping previously went through the implementation of the UPP programme. They have been, in the language of the Brazilian state, 'pacified'—illustrating the extent to which the informational corporation, which through calculation advances a governmental form of power, depends on forms of state violence to establish its regime.

The mobilisation of spatial media in favelas illustrates the tensions generated by the overlapping of digital code (a simplified configuration of space through digital calculability) and non-digital code (the informal and unwritten rules that establish the operation of power and guide conducts in favelas). Whether advanced by the state or by Google, altering the nature and function of territory, terrain and border is not without obstacles. It comprises not only technologies but also ways of thinking about territory and population, as well as novel mechanisms for calculating them. Despite the 'pacified' status of favelas selected for digital mapping, conflicts around territorial power provide both context and substance to the mapping exercise—illustrated by the troublesome nature of access to the sites to be digitally coded, the required nuanced knowledge of such sites, and the rationalities of resistance against the digital map. Previously, in the context of UPPs, scholars have identified the various local resistances to mapping in favelas and the extent to which this "significantly increase the knowledge and hence the power of outsiders" (Freeman, 2014: 18). In the case of Google Maps, some residents fear that the digital map will bring with it forms exposure, eviction or displacement, and would prefer to be left out. Dwellers speak of the value of not being on the map as a way of avoiding the impositions of a calculative territorial sovereignty, such as taxation, or maintaining beneficial forms of irregularity, such as informal and unpaid connections to the electricity grid.

The functioning of Favelas through multiple, overlapping, semi-mundane and context-specific unwritten codes, like elsewhere in the city, highlights the complexity of the non-digital 'location awareness' that makes politics and everyday life. Residents are the only 'sensors' (c.f. Gabrys, 2014) capable of reading the non-digital codes of space—how, when and where to circulate. Translating their lived experience of location awareness to the strip down categories of the digital map, their local knowledge keeps the digitalization of territory going. Terrain, as a particular three-dimensional reading of both the materiality of territory and its securitization (Elden, 2013b), is of particular importance here. In hilly favelas, given their volumetric nature (c.f. Graham, 2016), only resident mappers have the intimate and nuanced spatial knowledge required for interpreting urban form and translating urban materialities into digital code: steep and interrupted alleys, informal 'rights of way' across private spaces, shortcuts over roofs, and the micro-temporal dimension of what local movements and flows are allowed. The role of digital mapper is likely to be given to someone born and raised in the community. "This is the greatest *pulo do gato* ('trick of the trade') of *Ta no Mapa*" explains a project coordinator: "we recruit people who know how to circulate in these places, who have a sense of danger, [and] a sense of how far they can go and where they cannot go" (Interview, 2015). By being residents, mappers are permitted to circulate freely; they understand the local codes of conduct, unwritten rules and tacit spatial boundaries that mark the limits of what is allowed/not allowed to be placed in the digital map.

The multiplicity of codes and ways of thinking shaping the politics of space can hardly be captured by a digitally-based location awareness. Local and context specific practices—such as a requirement to have windows down when in a car, the need to avoid certain areas at certain hours of the day, or to dress in keeping with the symbolic colour codes of drug factions—do not translate. Yet, the digital mapping and its demand for calculative rationalities imposes a numeric and simplified way of ordering space; one that, in favelas, is often absent: telephone numbers, postal codes and even business opening hours. This would not be the first time that, in reimagining the city, a techno-utopian dream backed by the logics of functional simplification fails to understand the role of local knowledges and the microsociology of public order, as encapsulated by Scott's analysis of Brasilia in *Seeing Like a State*. Yet, as pointed out by Scott, "To codify local practices [is] a profoundly political act" (1998: 37). The simplified form of location awareness of Google Maps, as mobilised in *Ta no Mapa*, has one aim in mind: to re-define social exclusion as economic exclusion and incorporate spatial value despite any obvious urban inequality.

6. Conclusions

In translating their unique 'location awareness' to digital languages and platforms, favela residents are presented as the main actors on a new techno-utopian path towards social justice and economic inclusion—Google and data as the new powers capable of suspending the exceptions of informality. While the wall between favelas and the city is not broken, a gap is opened in order to secure calculability. Yet, this is never meant to be the calculability of communities as a whole, nor of their deficiencies, complexities and aspirations, but of their economic flows and businesses. Here, the coming together of digital mapping and the geoweb supports a form of governmental power, exercised through techniques of enumeration and spatial calculation, mobilized through the freedoms and capacities of the governed, and aimed at opening the favela to broader economic circulations.

We have argued in this article that digital mapping is an exercise in producing territory in its political sense. The article points to the importance of attending more to territory as a way of thinking about the politics of emerging digital urbanisms. In favelas, characterized by contested governing forms and conflicting and overlapping powers, digital mapping inevitably embodies particular forms of politics—which in turn have implications for how forms of exclusion and/or inclusion are configured in the city. Through digitally mapping favelas, Google Maps is advancing a project where equity and social justice is achieved not so much through social inclusion and service provision, but rather through a calculative incorporation to a specific economic regime. On a broader scale, it is important to acknowledge that the potential benefit and progressive impact of mapping the sites of urban informality—through an involvement of residents and dwellers—is undeniable, as both activists and academics have shown worldwide in the context of slums (Patel et al., 2012; Livengood and Kunte, 2012). But this is also a process that operates at multiple levels, and that needs to be read in the context of contemporary processes of capital expansion and the enrolment of subjects, digital techniques and computational logics in the creation of sites of accumulation.

In the case of Google's involvement in digitally mapping favelas, what is at stake is not so much visibility and recognition, but rather calculation and the coming together of space and the database of economic flows. Here, in the digital making of territory, enabling or restricting flow and circulation appear to be the currency at stake; the crux in the tensions between sovereign and governmental powers. Digital tools are mobilised as the subtle weapon of the new powers to be. As such, the informational corporation (i.e. Google) seemingly works through governmentality. But it would be a mistake to see the arrival of digitally-enabled territorial powers as a battle between governmentality and sovereignity.

Rather, these are entangled. The prioritization of 'pacified' favelas in the digital reconfiguration of territory points to the role of state violence in clearing the way for corporate governmentality, and in doing so, the role of the state in engendering new forms of territorial sovereignty. This is a new and complex configuration of sovereignty. Nevertheless, in the digital making of territory, it is the pairing of the spatial database with the gathering and control of information flows that concedes the ability to shape market configurations and capital flows, positioning the informational corporation as a linchpin in the recasting of the city as a space of market sovereignties.

Just like statistics plays a key role in the making of a governable population, digital mapping plays a role in making favelas and their population into a new form of urban territories. Through digital incorporation, favelas become part of broader processes of governing characterised by an in-depth involvement of a multiplicity of global agents and their logics, from digital ICT corporates to financial flows. The challenges and contestations that the digital map experiences in favelas alert us against the fetishization of digital modes of planning, hinting towards both a resistance to and the limits of the simplification and fragmentation of digitally-enabled locational awareness. But beyond urban informality (beyond the favela itself), what is at stake in Google's digital mapping is the development of new forms of terriorialization through digital calculation. Such use of spatial media represents an emerging form of making territory through computational logics. Through its calculative logics, it reshapes territory, reshapes sovereignty, and reshapes the ways in which citizens engage with the sovereign powers at play, advancing a model where territory as a political space is constructed through digital-economic incorporation.

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