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Mobilising the dispositive: exploring the role of dockless public bike sharing in transforming urban governance in Shanghai

In: Urban Studies

Abstract

This paper contributes to debates on urban governance and mobility through a case study of the transformation of public bike sharing schemes in Shanghai (China) from fixed/ docked (PBSS 1.0) to flexible/ dockless (PBSS 2.0). Based upon stakeholder interviews and observations between 2015 and 2017, we use the concept of dispositive to foreground two related processes. The first is the reformulation of the governmental dispositive that coalesces around PBSS in Shanghai. We show how the relations within the dispositive shift from more hierarchical, bounded, regulated and state-led to those characterised by a more dispersed, disconnected, horizontal and distant set of social relations. Secondly, we show how this dispositive both produces and is produced by an emergent environmentality (Gabrys 2014) that manifests in a fixed territorially in PBSS1.0 and a more fluid and deterritorialised digital environmentality in PBSS2.0. In framing this shift, we demonstrate how PBSS 2.0 produces a new dispositive of urban governmentality where the conduct of users is dispersed through a much less co-ordinated network of actors and technologies. Ultimately we argue that it is no longer possible to separate physical and virtual mobility when trying to understand the internal dynamics and external manifestations of mobility governance, which in our example are characterized by less localized and less hierarchical relationships that are more fluid, voluntary, and physically distant.

Keywords: Transport, Planning, Neighbourhood, Governance, Policy, Mobility, Cycling

1. Introduction

Amongst initiatives designed to increase the mode share of urban utility cycling, public bike sharing schemes (PBSS) have increasingly been employed to pursue the concept of green mobility. A more recent wave of enthusiasm for their use in large cities was kick-started around 2007 with the introduction of the Velib system in Paris (Shaheen et al 2010). A decade later DeMaio and Meddin's (2017) 'Bike Sharing World Map' identified 1328 PBSS Schemes worldwide in operation (July 2017) with a further 405 planned or under construction. Following this trend, the promotion of urban cycling – and PBSS in particular – has been pursued vociferously in Chinese cities (Mason et al 2015) as a crucial policy tool in the new paradigm of modernization; clearly representing a break from a previous emphasis on motorised transportation and infrastructure identified as the cause of a variety of 'urban illnesses', most notably traffic congestion and environmental pollution. Exemplifying this trend, between 2009-2016, Shanghai (as the most westernized Chinese metropolis) implemented a docked/fixed system of PBSS 1.0 in 9 districts, with 80000 public bikes at the peak of operation. Prior to the dockless/flexible PBSS2.0 boom of 2016, this symbolized a resurgence of green mobility in Shanghai.

Beginning in spring 2015, a new form of dockless/ flexible bike sharing financed and managed by private operators, and hailed using a mobile phone app was rolled out in Shanghai. We use the term PBSS 2.0 in this paper to distinguish these systems from the older generation of PBSS 1.0 which do not utilize ICTs to enable user access and required physical docking stations. The growth of PBSS 2.0 schemes in Shanghai has been nothing if not meteoric. By February 2017 there were 260,000 public bikes, rising to 630,000 bikes by April 2017 with 7.5 million registered users and at least 10 different operators. By August 2017 there were 1.5 million public bikes in the city – 16 per resident – with two Chinese firms Mobike & Ofo dominating the market alongside many smaller firms, the vast majority of which had disappeared by mid

2018 due to intense competition. The success and unlimited expansion of market-led PBSS 2.0 also rapidly marginalized and replaced PBSS 1.0 with the smartphonized and privatized PBSS 2.0 seen as a contingent and market-led solution to the failures of the previous system. Here we demonstrate how this new form of mobility is both produced by and generative of new forms of dynamic and contingent urban governance, practice and subjects (De Souza E Silva 2006).

To-date the competing processes and transformation of governance between PBSS 1.0 and PBSS 2.0 have seen little if any empirical and critical exploration. A number of studies have focused on the economic, environmental and health benefits of PBSS (Caulfield et al, 2017; Lin et al, 2011, 2013; Shen et al, 2018; Lu, 2016). However, the bulk of PBSS research has focused on operational issues, with substantial research on parking (Lin & Yang, 2011; Midgley, 2011; Paul & Bogenberger 2014); maintenance (Furth et al 2016); location (Shi et al 2018; Zhang & Mi, 2018); and redistribution of bicycles (Schuijbroek et al 2017). Whilst insightful, this is a largely instrumental literature geared towards convincing policy-makers of the benefits of PBSS and giving best practice advice on how to implement and maintain systems to maximize efficiency and profit.

A small number of studies have tackled issues of governance in PBSS. Fishman et al. (2014) have explored the role of the state in the regulation of shared bicycles, showing that it has at best been loosely strategized. Guo et al. (2014) highlight the additional problems that PBSS brings to government with requirements for new legislation, industry supervision and infrastructure support. Echoing this, Yoon et al (2012) point to the time-lag between the appearance of PBSS as a new urban innovation and any corresponding governance and management structures. Huré & Passalacqua (2017) argue that new "government-market-society" forms of coordination found in PBSS2.0 reflect a response to failures of both the

market and government intervention in previous iterations of PBSS. Again these studies are useful in understanding some of the failures of governance but see (more or less successful) PBSS as an outcome of governance, rather than a central way in which governance (and subjects) are produced.

Mobility we would argue is a powerful yet under-researched force in the reshaping of governance and related socio-spatial arrangements. Despite some theoretical expositions (Baerenholdt 2013; Kitchin et al 2009; Manderscheid 2014; Urry 2000) there is little literature in the mobilities turn exploring the impacts of new forms of mobility/communication on existing modes of governance. This is all the more surprising given the centrality of this theme in the new mobilities paradigm (de Souza E Sliva 2006; Sheller & Urry 2006; Urry 2000). On the one hand, new ICTs and resulting forms of shared mobility have produced new connectivity, often positioning them as, “seemingly liberating tools, allowing citizens to engage in ever more democratic actions” and become active and self-ruling participants in the governance of environment and mobility (Gabrys, 2014, p. 42; McLaren & Agyeman, 2015). On the other hand, “the distributed and networked nature of technologies” also produces new environmental/mobile subjects; the transformation of socio-spatial relationships; and more complex networks with heterogeneous actors (Bærenholdt, 2013; Wang, 2015, p. 323). The recent rapid development of PBSS in China provides an apposite case study through which to explore these reconfigurations and their outcomes. In particular, new technologies and degrees of control have the potential to create more complicated monitoring or governing at a distance, reshaping power geometries and contradictions within new mobility governance arrangements (Gabrys, 2014; Spinney & Lin, 2018).

Taking the transformative process and struggle from PBSS 1.0 to PBSS 2.0 in Shanghai as its object of study, this paper aims to develop the Foucauldian perspective of dispositive to

investigate and conceptualize the shifts in governance that both produce and arise from this shift. A number of mobilities scholars have suggested a Foucauldian approach is insightful when investigating the socio-political construction and governance of mobility in relation to the interaction between knowledge, power and mobile subject-building (Bærenholdt, 2013; Manderscheid, Schwanen, & Tyfield, 2015, pp. 2-3). In particular, calls to understand the reshaping of urban environments and citizens through mobility have challenged our understanding of governance which usually refers to a more traditional “territorial fixity by bonds and borders” with corresponding governing administration and regulation (Bærenholdt, 2013, p. 20; Jensen, 2011). More recent accounts challenge such fixity arguing instead for a focus on the flow and freedom of different urban subjects, by which different socio-political dimensions and related stakeholders are connected dynamically and contingently (ibid). Baerenholdt (2013) refers to this as ‘governmobility’ – governing through mobility. In this context, the dispositive perspective can help to explore the heterogeneity and dynamism of assemblage and connections between different knowledges, political rationalities, agendas, and urban subjects and objects (Manderscheid et al. 2015). In particular, it is useful in exploring the “productive power of complex socio-material or socio-technical arrangements” rather than relatively, “simplistic hierarchical perspectives” that usually refer to pre-defined actors, agency and discipline (Braun, 2014; Gailing, 2016, p. 244; 255).

By using Shanghai’s ongoing development of PBSS as a case study, this paper aims to explore and highlight governing failures and changing dispositive characteristics in the shift from PBSS 1.0 to PBSS 2.0. In doing so it seeks to make two main contributions: firstly by working at the boundaries of Foucault-inspired work on urban governance and mobilities scholarship it seeks to progress our understanding of the ways in which increasingly mobile and fluid connections are reshaping governing relations. Secondly, it provides a much needed case study of mobility governance in an Asian context, adding to a nascent literature (Tyfield 2014; 2015; Zuev et al

2019) on this topic. The paper is divided into five sections. Firstly, we develop our conceptual framework of dispositive in relation to the socio-political production of subjects, which we theorise as a continuing performance influenced by environmental interventions or ‘environmentality’ (Gabrys 2018). In the second section we illustrate that in responding to twin matters of concern: cosmopolitan rationality and urban illness, PBSS 1.0 has been shaped as a state-led dispositive that articulates a political rationality and ‘mobility-fix’ (Spinney 2016). In the third section we build upon this by investigating the localization of PBSS 1.0 and China’s local pastoral politics. We illustrate how the pastoral governance of PBSS 1.0 results in a fragmented governance, disconnected service and constrained mobile subjects that ultimately result in a failure to produce the desired mobile subjects. In the fourth section, we explore the emergence of PBSS 2.0 as a more ‘efficient’ dispositive that addresses the failures of PBSS 1.0. In particular we explore the production of an ‘unbounded’ mobile subject better capable of performing the desired green mobility, and representing a more efficient and effective assemblage to deliver diverse political-economic demands. In the fifth and final section, we show how tensions within and between PBSS 2.0 operators, citizens and state actors have rendered the dispositive and related mobile subjects ungovernable. We argue that both public and private sectors have failed to fully comprehend and deliberate upon the heterogeneous and dynamic nature of the emergent dispositive.

2. The concept of dispositive in exploring mobility and its spatiality

A dispositive refers to “the nature of connection” or network between/of “heterogeneous elements” that were previously disconnected and even contradictory but are assembled into a new “strategic assemblage”, or more “decentered totality” (Braun, 2014, p. 52; Foucault, 1980, p. 194). Mincke and Lemonne (2015) have shown that the study of dispositive and mobility requires more than exploring issues of transportation or mobility itself. Rather, it focuses attention on the complex formation, process or transformation of social-technical,

heterogeneous ensembles, and the relations and productive power between governing elements inside/outside specific forms of mobility, or between mobile and immobile subjects (Gailing, 2016; Mincke & Lemonne, 2015). Thus Braun (2014) and Raffnsøe, et al (2016) have suggested that the concept of dispositive can address weaknesses identified in past Foucauldian approaches where relations are characterized as less discipline-led, and more contingent, heterogeneous and fluid. In the following sections, we illustrate and develop three aspects of this concept for studying mobility.

Firstly, the dispositive perspective foregrounds the socio-political production of new subjects that respond to matters of concern (Agamben 2009, 5; Manderscheid et al. , 2015). Investigating mobility by dispositive thinking, as Manderscheid (2014, p. 609) suggests, requires asking the question, “what are mobility dispositifs a solution to?” which relates to “what happened and what changed so that mobility as an object of knowledge” becomes an object “and a practice to be governed [and] moved to the fore?” On the one hand, the understanding of an emerging dispositive and corresponding subjectification relates to urgent crises or “specific purposes at a particular historical conjuncture” where “particular challenges and predicaments, constitutes, runs through, and changes the principal institutions and organizations” (Rabinow & Rose, 2003, p. 10; Raffnsøe et al., 2016, p. 280). In this reading, the rationale of any emerging new dispositive and subjects fundamentally relates to the identification and proposed solutions of specific urgencies, and the process, political rationality and agenda to respond. On the other hand, exploration of any reconfiguration can begin from the failure, struggle and negation of the old subject, such as previous policy agendas or mechanisms (Foucault, 1980; Raffnsøe et al., 2016). Instead of returning to “the humanist concept of the subject”, Wang (2015, p. 323) suggests, the focus should be to “understand how the self becomes traversed by multiple techniques and discourses that take the subject as their domain of problematization” (Mincke & Lemonne, 2015). Accordingly our understanding of

the dispositive of mobility, as Agamben (2009) and Manderscheid (2014, p. 615) state, can begin from exploring the failures of previous subjects that may, for instance, force the new “formation and control of mobile individuals and collectives through the exercise of power.” In terms of researching public bikes, the failures of PBSS1.0, and imperatives of green mobility and the sharing economy provide an opportunist process that produces new dispositive and solutions.

Secondly, the formation of a dispositive also concerns (re-)producing relations, connections or even conflicts between heterogeneous elements of governance. For Foucault (2000, p. 337), the characteristics of power could be understood through deconstructing the “play relations between individuals... between partners.” As this implies, exploring the opportunist “process of ‘wayfinding’” plays a key role in the analysis of dispositive, since “each action and each related intention are intersected by other actions; and because of this interaction, the result is never fully pre-determined” (Raffnsøe et al., 2016, p. 286). Differently from traditional organization studies, the concept of dispositive questions the decisive and close relationship between agency and change, and blurs the “sharp distinction between inside and outside the organization, and between the individual and the collective” (Braun, 2014; Raffnsøe et al., 2016, p. 274). For Foucault (1980, p. 195), “there is a perpetual process of strategic elaboration” that seeks to deliberate and justify the more “efficient and rational method that could be applied to” issues of governing. Thus, a key question from a dispositive perspective refers to “how diffuse and contingent social processes produce particular kinds of subjects and meanings”, and seeks to understand “the normativity emerging in what is done” or the intentional or unintentional process of transforming subjects and ways of governance (Gailing, 2016, p. 249; Raffnsøe et al., 2016, p. 284). In mobilities research, the value of such a perspective is to inspire researchers to investigate the socio-political construction of “the interrelatedness of mobilities and power/inequalities”, and the inconsistencies and

contradictions between different subjects or governing elements that can disclose the multidimensional “patterns of power structuration” (Manderscheid, 2014, p. 605).

Thirdly, the relations of a dispositive are shaped and (de)stabilized by the continuing performance of subjects and related environmental/spatial interventions. In terms of understanding the collectivity (dispositive)-building and power-structure within heterogeneous elements or subjects, relations should be accepted and performed between/by them, that “are key to understanding how modes of governance, ways of life, and political possibilities emerge or are sustained” (Gabrys, 2014, p. 36; Van der Duim, 2007). Similarly, Manderscheid (2014, p. 619) states that the interplay between elements of a dispositive, “are continuously performed and enacted by moving and immobile bodies”, in which the development of dispositive should be understood as relational to the socio-political performance of the subject within its corresponding spatial or environmental arrangements. Gabrys (2014) argues that the production and performance of the subject is governed by “an environmental type of intervention instead of the internal subjugation of individuals.” Gabrys (2014, p. 34) calls this ‘environmentality’ where influencing the “rules of the game” is accomplished through the modulation and regulation of environments rather than merely “subject-based or population-based distributions of governance.” Accordingly, the ways in which dispositives shape (and are shaped by) new mobile landscapes and related material-political relations involving heterogeneous sectors and stakeholders becomes an important focus of attention. This is primarily because these serve to sustain the performance and diffusion of new subjects within a specific urban milieu that “generates material–spatial arrangements in which and through which, distinct dispositifs, or apparatuses, operate” (Gabrys, 2014, p. 34; Spinney & Lin, 2019). Indeed, the production and governance of new mobilities is fundamentally linked to the regeneration of the urban environment, and thus environmentality plays a crucial role in analyzing the practice of a dispositive.

The following sections represent the results of our main empirical investigation in Shanghai¹ based upon two main sources. The first relates to a series of researcher observations, in-depth interviews and group discussions organised by the authors with the help from related experts of local universities, and transportation and planning authorities, between April 2016 and January 2018. The key interviewees and participants include 5 planning/transport experts and scholars, 6 officials from city and district government level to street office, 4 private sector representatives (including staff from Mobike, Ofo and Shanghai Forever' Bicycle Cooperation), and 4 cycling-related third sector representatives (such as The Association of Bike Industries). The second set of sources include government reports and strategy documents, and media and news reports relating to the implementation of PBSS 1.0 and PBSS 2.0 in Shanghai and China more broadly.

3. PBSS 1.0 in Shanghai: a state-led dispositive concerned to 'fix' mobility through production of the 'right' subjects

The recent cycling 'renaissance' and surge of interest in PBSS in China is the result of a re-construction of cycling's socio-political position in the process of modernizing cities (Spinney 2016; Spinney & Lin 2019). Whilst the 1990s saw many Chinese cities set targets to reduce

¹ Our decision to focus on Shanghai was to some extent driven initially by fortune: the authors were already conducting work on PBSS1.0 in other cities and had just started to talk to policy advisors in Shanghai when the dockless firms arrived in force in 2016. Other factors also make Shanghai an apposite case study: its importance as a test-bed for other Chinese cities and a global lens into the new China make what happens in the city highly relevant both domestically and globally. In addition to this, central Shanghai is relatively bike-friendly in its layout and was one of the Chinese cities that chose not to ban E-bikes. Accordingly our 'choice' of case study is justified because of the influence exerted on other Chinese cities by precedents in handling of policy and innovation within the city.

cycling because it was deemed to reduce road efficiency and symbolize backwardness (SMPG 2002, 29-32) its fortunes have taken an upward turn in the last decade.

From around 2007 there were signs of a policy shift from central and city government due to the manifestation of a range of issues from the motorisation of mobility in relation to cosmopolitan discourses of green mobility. By 2009, China had become the largest global market for automobiles, but addressing the side-effects of this expansion (including traffic congestion, air pollution and land shortage (Hu, 2012; Lee & Xu, 2012) became increasingly urgent (Sartor 2011). According to the "Shanghai Urban Transport Operation Annual Report 2015", the growth of the motor vehicle and private car has far outstripped the capacity of current traffic infrastructure and the growth of new roads (SUTA, 2015) resulting in a government strategy similar to Travel Demand Management (TDM) focused on re-distribution of 'right-of-way' for cycling. Borrowing from schemes observed overseas, a new dispositive coalesced around PBSS1.0 as a means of practicing a green mobility that could represent a 'healthier' and new 'progressive' rhetoric of political rationality (or conduct).

In addition to internal concerns, the pro-cycling policy shift through PBSS is partly the result of external forces at the global scale, through which cycling is repositioned as a new progressive subject of mobility. These external forces manifest as a cosmopolitan rationality of green mobility that reproduces "superficial discursive similarities" of "western-centric accounts" through diverse international events in China (Spinney & Lin, 2018; Zuev et al., 2019). In 2008 for example, the first large-scale PBSS opened in conjunction with the Beijing Olympic Games. It signified to a global audience that China was pursuing a new urban modernity towards green mobility that would address traffic congestion and environmental issues (Lee & Xu, 2012; Spinney & Lin, 2018). At the same time, the promotion of PBSS was also meant to demonstrate to local governments that they should seek to produce more progressive mobile subjects. Consequently, the urban cyclist has been repositioned as the

healthier and more progressive subject required to respond to both the cities' local illnesses and cosmopolitan image building. In line with these matters of concern, from around 2010, PBSS 1.0 has been widely promoted as a practical and cost-effective mechanism to materialize a top-down conduct of green mobility, and state-led dispositive that seeks to produce cycling subjects.

As a result, green mobility embodied in PBSS has been constructed as a multi-scalar agenda to conduct major cities, local states and communities. City governments across China were asked to build 100 model experimental PBSS projects that would be operational before 2015. Shanghai featured as one of the test-beds for this policy with five Shanghai districts² and associated Street Offices experimenting with PBSS 1.0 in 2009. After this, the growth of PBSS 1.0 is comparatively rapid: by 2014 (according to the 'Bike Sharing World Map') China possessed over half the public bikes in the world, with Shanghai ranked 9th in the world for the size of its fleet³. Our interviews confirmed that by early 2017 Shanghai had almost 80,000 PBSS 1.0 bikes putting it amongst the top 5 cities for PBSS worldwide. PBSS 1.0 it seemed was an economical and fast way to practice the new mobility. As one SMPG policy advisor commented 'the public bike is relatively easy to achieve the higher traffic rate with less cost...'. In this respect, urban cycling and PBSS function as what Spinney (2016, p. 455) calls a 'mobility fix' that represents an alternative and contingent "second best" solution seeking to deal with problems of accumulation (such as increased congestion and corresponding loss of productivity) by acting through mobility.

For central government, PBSS 1.0 also represents a localized solution that can conduct local

² They are Pudong, Minhang, Baoshan, Songjiang, Changning districts. By 2014, these districts had created 912 PBSS 1.0 docking stations, with 26,000 bikes. See <http://www.qle.me/detail/index/2339>.

³ http://www.thepaper.cn/newsDetail_forward_1265087

states and communities to exercise the self-governance of mobility-fix at a distance, thus avoiding any potential backlash from citizens. The aspirations of the Chinese central government to implement PBSS become devolved mainly through a reorientation of governing mobility down to the local district and its SO in the community administration level. For example, the ‘Ministry of Housing and Urban-Rural Construction’ (2013) announced a ‘Demonstration Project for Urban Pedestrian and Bicycle Transportation System’ through which it sought to promote international standards on cycle planning and design for those at the local level to follow. In Shanghai, as local SO officials’ recalled, they were encouraged to operationalise this conduct by taking responsibility to build their own PBSS based on their interpretation of the guidance. This clearly places a distance between the centre and the citizen because the shape that PBSS takes is seen to be determined at the local level with the centre acting only as a guide. Related to this, the design of PBSS is clearly materialized as an environmental intervention seeking to reshape the city’s landscape of mobility, for example by linking the PBSS with local tourism or science parks.

This devolved implementation (and ultimate failure) of PBSS1.0 was also characterized by a pastoral mode of state-led governance which led to the fragmentation of neighbouring PBSS. This situation, as a cycling policy expert explained in interview, came about because local leaders saw it as an opportunity to articulate an ethic of care for their citizens:

‘[they] decide to spend money on local... people to give them this kind welfare... This guides by a power of will, that is to say, I set up this thing and give it free by my will, not a market operation... or professional decision’

This leader-led implementation refers to Lin and Kuo’s (2013) concept of territorialised ‘pastorship’ of governing social welfare and communities. In this pastoral relationship of

governance, the governors gain legitimacy from their people not necessarily by legal or professional administration, but by demonstrating his/her kindness or political righteousness, like a pastor demonstrating benevolence and truth to his flock (Lin & Kuo, 2013). However, this self-governing territorialised ‘pastorship’ causes a political-economic fragmentation and unevenness of PBSS 1.0 because local leaders want to take credit for it (in order to be recognized as benevolent and progressive), and therefore ensure it mainly operates within their territory. For example one SO official recalled his experience of system implementation noting that the city and district government ‘never take it as their matter to coordinate... you just make your own deal [with the system provider] and develop your own system...’. As such each local leader implements a form of environmentality that is contingent upon reproducing their own spheres of power and therefore tightly bounded. For example with geographical segregation of administration, each DO or SO has a ‘separate’ registration centre, and no capability for users to borrow and return bikes across ‘invisible’ boundaries. As a result, the operational spheres of PBSS1.0 generally map to the geographical jurisdiction and political resources of DO or SO with little or no collaboration between them. Whilst some adjoining areas may have a well developed PBSS1.0, other neighbouring districts may have less, incompatible or no PBSS at all. The corollary of this territorially bounded dispositive and its environmentality is the production of a fragmented landscape of public cycling and confined mobile subjects of PBSS. Consequently, the environmentality of PBSS1.0 is heavily bounded by the territorial constraints of local government and the technical constraints of PBSS1.0 operation.

A further problem arising from the way in which PBSS1.0 manifested was due to the fact that it became a marginalized and symbolic performance existing in Shanghai’s periphery rather than the centre where the green mobility-fix was deemed to be more urgently required. Indeed, PBSS stakeholders were faced with numerous obstacles in trying to expand their service in central Shanghai. For example, rigid regulations excluded the construction of ‘fixed’ docking

infrastructure in many inner-city areas.⁴ Although the ‘Shanghai Forever’ bicycle cooperation is the largest sub-contracted provider of PBSS1.0 infrastructure, it still suffered difficulties meeting related regulations as the manager explained:

‘in the city centre, the requirement of sidewalk width to build the bike docks is higher. We have been forced to consider only building on the sidewalk that is more than 3.5 meters wide... and many sidewalks cannot meet this standard... We also need to avoid the interference of ‘tactile route for the blind...’

Compounding this, local government and property owners within the inner city also stated that they were less interested in dealing with the infrastructure or land issues related to development of PBSS1.0 because of the limited ‘political’ and ‘financial’ capital it could generate compared to property-led regeneration. As a result of these deterrents in central areas, the development of PBSS 1.0 and related mobile subjects has largely been confined to the small administrative territories of rural and peripheral areas with the result that PBSS has been marginalized from the inner-city area. Whilst there are nine DO or SO (such as Minhang District or Pudong Street Office) that have developed PBSS 1.0, none of them are in central Shanghai where poor air quality, congestion and lack of space are at their worst and the schemes could have the most positive impact.

The result of this piecemeal approach is the existence of multiple disconnected, peripheral, small ‘cycling kingdoms’ of pastoral governors that are only sporadically capable of producing an environmentality that could allow subjects to perform the desired green mobility.

⁴ In addition to such planning issues, Shanghai’s push to accommodate cars means that bikes are banned from many main roads and there are insufficient spaces left for bikes to park or ride safely in central Shanghai.

Exemplifying this, when observing two allegedly well-used PBSS 1.0 stations during field work we found not a single user during one week of daily observations. When interviewing local NGOs and users, whilst most of them regarded PBSS 1.0 as a morally 'good' mobility, they also noted it was a failed service that was unattractive and inconvenient to most citizens. One local planning official from Shanghai's Pudong District admitted that as a result the main function of PBSS 1.0 was symbolic in that it associated Shanghai with a cosmopolitan rationality of cycling: "It is like to create a feeling of coming to live or work here is like foreign countries...?" In this context, the confined and fixed environmentality of PBSS1.0 cannot produce desirable effects and related mobile subjects leading to a failure of physical (and symbolic) performance, pre-empting a new matter of concern and setting the stage for PBSS 2.0.

4. The emergence of PBSS 2.0 as a more efficient and legitimated dispositive: its birth, escape and reconnection

PBSS 2.0 as a new dispositive emerges from a process of subjectification that seeks to produce 'location-free' and 'regulation-free' mobile subjects who can not only address the fragmented and confined failures of PBSS 1.0 but who are also capable of achieving the economies of scale and scope required by surveillance capitalism (Zuboff 2019). Agamben (2009) states that our understanding of a dispositive can begin from illustrating the emergence of new subjects in relation to the crises of governing socio-political affairs. In this instance, PBSS 2.0 evidently emerges from the intersection of two crises: the first refers to PBSS 1.0, particularly its territorial limitations and fragmented governance; the second from the need to put idle technology and capital to use after the failure of car-sharing firms Uber & Didi. By enabling smart-phonised users to unlock and activate bikes everywhere, PBSS 2.0 produces new hybrid mobile subjects no longer bound within specific locations or territories to access bikes (and subjects who also generate potentially valuable data for the Internet giants who have invested

heavily in PBSS2.0 firms Mobike and Ofo⁵). One SMPG transport consultant provided a metaphor to contrast the fixed PBSS 1.0 and flexible PBSS 2.0 and explain the latter's rapid growth: 'it is like bus and taxi, one you need to find a station, the other doesn't matter'. This spatial unmooring also reflects and produces a governmental unmooring where the user/mobile subject is neither territorially or politically part of the planned and pastoral governance of PBSS. Rather PBSS 2.0 represents a market-led and bottom-up dispositive constituted through the convergence of digital platforms, mobile access points and enormous numbers of 'free' cycling subjects that can expand to the whole city⁶.

As this suggests, a key difference between PBSS 1.0 and PBSS 2.0 as a dispositive is not only a freeing up of infrastructure from locative fixity, but also a freeing-up of locative pastoral governance and environmentality previously predicated upon the rationalities, regulations and politics of governing mobility and urban spaces. The previous agenda underpinning fixed PBSS1.0 stems from 'top-down' rationalities seeking to implement political conduct through

⁵ By June 2017 Mobike had secured funding of almost US\$1 billion and was valued at US\$3 billion in the same month (Crunchbase 2019:n.p). By 2019 Ofo had raised US\$2.2 billion in funding (ibid). Alongside venture capitalists, the main investors included web-giants Alibaba, Tencent and Meituan-Dianping (ibid).

⁶ That is not to say that it has been all plain sailing for either firm: 2018 saw a marked downturn in the outlook for PBSS 2.0 with Mobike (and a sizeable chunk of its debt) acquired by Chinese web company Meituan-Dianping for US\$2.7 billion in April 2018 with a name change from Mobike to Meituan Bike confirmed in January 2019 (Crunchbase 2019:n.p). In December 2018 Ofo was fined for defaulting on debt and on the verge of bankruptcy; sued by suppliers, had assets frozen (Hu, 2019:n.p) and was banned from operating in Singapore, one of its main territories (Dowling 2019:n.p).

green mobility; to govern fixed objects (infrastructure) and static subjects (fixed access users) within a bounded socio-political sphere rather than the governance of dynamic and socio-political interrelating mobilities (Bærenholdt, 2013; Lemke, 2015). In contrast the flexible locative rationality of PBSS2.0 is generated through the information collected from the communication between the GPS enabled smartphone; the PBSS operator's phone app; and the GPS-enabled bike (as well as a whole host of back-end technology). This architecture is geared toward mobilizing both bikes and citizens, enabling service providers to develop a more accurate understanding and mapping of PBSS users dynamics and demands in relation to bike distribution or further business expansion⁷. The metaphor used by Hu (the founder of market leader - Mobike) in 2017 to describe this is one of robots circulating Shanghai everywhere, governed by the intelligences and requirements of mobile citizens⁸. Tyfield (2014) has been at pains to point out the connections between (auto)mobility and broader geo-political and economic hegemony (587, see also Tyfield 2018). A selective and celebratory reading by Hu ignores the broader role of capital in governing relations, instead positioning the PBSS 2.0 mobility subject as the key agent in shaping a new urban milieu and flexible environmentality. This represents a situation where as Gabrys (2014, p. 38) points out, "governance.... of the urban milieu occurs not through delineations of territory, but through enabling the connections and processes of everyday urban inhabitations within computational modalities". The rationality guiding PBSS 2.0 is much less 'certain' and governed by the emergent daily mobility needs of hybridized users to spread 'new' sharing bikes contingently and collectively.

The flexibility outlined above is also materialized and exemplified in the fact that PBSS 2.0 becomes unmoored from planning and administrative regulations. Such freedom represents a

⁷ In 2017 field work, a Mobike internal report was shown to us in which Mobike maps and analyzes all user data to understand the general pattern of Mobike's mobility to rethink its future strategies.

⁸ See local news: <https://kknews.cc/zh-tw/tech/v9q9jx4.html>

significant advantage for institutional capital in competition with other PBSS (Schneider, Schulze-Bentrop, & Paunescu, 2010). This was argued by one PBSS 1.0 contractor as a source of inequality: ‘there are strict limits for us, such as official regulation or administration of sidewalk, the blind path or building docks... [PBSS 2.0] becomes free from these because of its dockless system...’. Here the contractor bemoans the fact that PBSS 2.0 providers can side-step planning regulations and permissions, and avoid long negotiations or rigid administration to require, for instance, parking places or access to public electricity systems for docking stations. Whilst most accounts of PBSS 2.0 focus on its key innovation as one of incorporating PBSS into the internet of things, a number of interviewees noted somewhat sarcastically that the ‘real innovation of PBSS 2.0 is in enabling institutional capital the freedom to escape from the limits that have confined both the physical and human elements of the PBSS assemblage’.

The point we wish to draw out from this discussion is that the self-conducting and self-sustaining PBSS 2.0 is evidently – albeit temporarily as we discuss in the next section - de-territorialised geographically and politically. Because locations are generated through the interaction of physical and virtual user mobility, users are free to connect with diverse administrative territories, places and people to perform as the new geographical and social assemblage. In becoming spatially unmoored with regard to access, the mobility and expansion of PBSS 2.0 is no longer dependent to the political leadership of pastoral governance, territory and financial support of a District or SO. As a senior local planner pointed out in interview, ‘previously, if you want to run PBSS, you need to win the bid to let local leaders buy your service. Now, you only need a mobile APP, and a bike with a ‘smart lock’’. PBSS 2.0 is evidently freed from the specific standards, bidding or service requirements that are linked to the political concern and domination of the local governor and their territory. As a result, PBSS 2.0 bikes pour into any locations that operators and users are willing to entertain, quickly filling in the gaps of the fragmented PBSS 1.0, particularly around the city centre, key attractions, and

busy metro or bus stations. Consequently, the PBSS 2.0 assemblage escapes from previous political rationality, regulation and pastoral territorialisation, creating decentralized and (seemingly) horizontal networks between different mobilities and fragmented territories where none are given priority except in the context of their contingent emergence through use.

PBSS 2.0 as an emerging dispositive also produces new entrepreneurial subjects in ‘moral clothing’ that hybridizes the concepts of green mobility and sharing economy. Inspired by ride-sharing platforms Uber and DiDi, PBSS 2.0 enterprises ‘smartphonize’ the ‘old’ cycling business through APP platforms, and in so doing, represent themselves (and cycling) as the new cutting-edge enterprise of ICT and sharing mobility. This resonates with Curran and Tyfield (2017) who have argued that high status, high technology goods are central to the character of Chinese low-carbon transition (133). By fitting with this dominant national narrative these enterprises gain a strong moral justification to avoid any official administrative burden in running a transport/cycling business. For example, although all bike manufacturers and service providers have to join the ‘Association of Bike Industry’ and accept its administration, this is not the case for PBSS 2.0 providers as a local scholar explained:

[PBSS 2.0] is like Uber or DiDi⁹. Previously, you need to follow the administrative regulations of a taxi company to have business registrations and certification. However, if you have been labelled as ‘sharing’, then...[you can avoid these]. [PBSS 2.0] is following... it usually frames itself as neither a bike-rental nor [public bike] company

Nonetheless, DiDi has faced serious challenges in Shanghai from its chaotic administration¹⁰,

⁹ DiDi is a Chinese version of Uber that has been regarded as one of the forerunners of China’s sharing economy.

¹⁰ Uber China was acquired by DiDi Chuxing Enterprise in 2016 and subsequently exited the Chinese

as a local official illustrated, “people always argued it is actually an unregistered taxi company with unlicensed and unregulated taxis and drivers.” By combining entrepreneurial, innovation, sharing, and green mobility associations, PBSS 2.0 seeks to legitimate it within multiple frames and avoid scrutiny by representing itself as an exceptional and ‘unprecedented’ (Zuboff 2019) subject above any blame. Indeed, PBSS 2.0 represents itself, as Spinney (2016) has argued, as ‘apple pie’ and relies on the implication that no one can critique such a ‘righteous’ thing. Formed from the entrance of a new mobile technology conjoining with existing physical mobility; the result is newly moralized (green) target for the development of sharing economy and related capital. As one local transport planner said during interview:

The Nation highly supports innovation and sharing economy, the sharing car is the first pot of gold to dig... But government has applied stringent control, so it is not hot any more... When the sharing bikes emerge as something good and green, capital finds its new opportunity.

The unexpected and rapid boom of PBSS 2.0 is partly due to the re-orientation of existing ‘smartphonized mobility’ toward another form of mobility after its original path (ride-sharing) was suppressed. It represents, as Gailing (2016) and Braun (2014) suggest, the contingent and path-finding characteristics of a dispositive, in this instance driven by capital. The hybrid mobility of PBSS 2.0 helps to confront previous critiques of capital speculation (as unregulated) in previous versions of sharing mobility, such as DiDi because it is allied to unassailable nationally important narratives of low carbon transition and technological innovation. In doing

market. However, DiDi’s reputation has been severely tarnished by a series of scandals relating to bad management, criminal driver behavior and customer safety; alongside moral questions regarding its role in low carbon transition given the contribution of ride hailing to worsening air pollution and congestion (<https://techcrunch.com/2019/05/06/didi-safety-pivot/>).

so it helps to create an ‘opportunistic’ path for capital accumulation with the least regulation and greatest legitimization.

This new political-economic territory forms part of a contingent, horizontal and strategic assemblage; a dispositive that Braun (2014, p. 61) describes as a decentered and “heterogeneous totality”, a horizontal network that has no top-down rationality or singular leader (Rabinow & Rose, 2003). Such an interpretation is backed up by a key policy advisor within Shanghai’s Transportation Commission, commenting that PBSS 2.0 does not fit into the conventional state-led and planned transportation construction because it has ‘involved different third party organisations and many new service suppliers... And also different authorities have been involved, no matter if they are willing or not...’. Indeed, PBSS 2.0 forms a privately-led dispositive with the involvement of multiple stakeholders (including an abstract rendering of the citizen) that were previously outside of transportation administration, including the planning department, ‘Urban Management Teams’, and community-based SOs.

Accordingly we wish to emphasise the importance of ICTs in reshaping not only the constitution but also the nature of relations in the dispositive. The introduction of ICTs into the dispositive reshapes it by cutting out particular actors (planners, District officials) and foregrounding the importance of others (phones, apps, entrepreneurs, citizens). It also changes the relationship between these actors: whereas there was seen to be a territorially-specific political ‘bond’ between user and local leader, there is now a distant and virtualized ICT mediated connection between PBSS2.0 operator and the user. Similarly, where there was a legal duty that bound provider with the planning authority, this bond is broken due to the unmooring of PBSS materialities. This shifts the social relations within the dispositive from bounded, proximate and physical to unbounded, distant and virtual.

It has been argued by the Xinhua News Agency that the Planning Department has been inefficient in providing the infrastructure and environment for the slow city and cycling renaissance¹¹. Nonetheless, PBSS 2.0 is seen to have helped perform the slow city and cycling renaissance within diverse urban spaces of central Shanghai through contingent mobility rather than planning. As one senior planning official commented: ‘Bikes have returned... We don’t need to worry about recruiting citizens to our slow city schemes now...’ For the planning authority, the wide application of PBSS 2.0 has helped to develop a far greater number of users and successful image of the new green paradigm than they had achieved through the past PBSS 1.0 or slow city building agenda. The unexpected sprawl of PBSS 2.0 has been regarded as a much more effective and efficient mobility-fix through privatisation and digitalization of public bike provision. It also released different authorities and local state actors from the burden/ duty of sharing the socio-political responsibilities to realise the policy targets of utilizing green-mobility, or the last mile solutions through cycling. As a leading planner of PuDong district noted,

‘[These companies] neither ask for your help or management, nor want you to subsidize... You don’t need to worry about extension of underground or bus lines... People can ride from anywhere to their home... It is handy both for government and people...’

The local state has little choice but to embrace PBSS 2.0’s autonomic and unexpected expansion because it is seen to ‘fix’ intractable urban problems through its dynamism and responsiveness to user mobility; as well as also again not requiring additional public resources and fixed infrastructure. Because of its perceived benefits, PBSS 2.0 forces new reactive and

¹¹ See http://big5.www.gov.cn/gate/big5/www.gov.cn/jrzg/2010-09/11/content_1700780.htm

contingent forms of governance to emerge. It represents a seemingly horizontal assemblage that connects different socio-political elements, and reduces, but does not completely abolish, the need for strategic and economic governance into the existing relations (Gailing, 2016; Rabinow & Rose, 2003). We would emphasise the ‘seemingly’ here because as Zuboff (2019); Krivy (2018); Smith (2016); and Spinney (2020 forthcoming) have argued, such systems are driven by surveillance capitalism and render users as powerful agents only as far as they are generative of data: users are not empowered to know the extent of data gathered or invited to assist in its analysis.

However, it is clear that PBSS 2.0 not only reconnects previously fragmented territories through location-free mobile subjects, but also shapes a more horizontal and strategic assemblage capable of operationalising an environmentality that functions more effectively in relation to specific matters of concern. As Agamben (2009) and Braun (2014) comment, it incorporates and governs heterogeneous elements or ‘living beings’ that were previously uncapturable and ungovernable. Within SMPG’s (2016) comprehensive strategy of developing Shanghai, PBSS 2.0 is identified as a core way in which new urbanism, livable and attractive humanity, and sustainable and low-carbon ecology can be achieved at more than just a symbolic level. In interview, a leading planner exemplified this by arguing that the flow of PBSS 2.0 had enabled new natural, connected and contingent flows of commuting, leisure and sport activities and facilities to emerge in Pudong’s entrepreneurial park, which in turn had shaped the ‘new lifestyle of the creative talent, science and technology people.’ Through the intersection of ICT-led sharing and green mobility, PBSS represents a legitimated and ‘efficient’ mobility-fix and environmentality that works through the reproduction of aggregated active cycling subjects.

5. The struggle to govern the ungovernable dispositive and ‘uncivilized’ mobile subjects

Whilst PBSS2.0 was hailed early on due to its citizen-centred responsiveness, that same

responsiveness itself soon became a matter of concern which in turn has pushed back upon the emergent dispositive. PBSS2.0 spread so rapidly between 2016-17 due to inter-firm competition, absence of regulation, and the need for scale, scope and action (see Zuboff 2019) that it produced a surfeit of bikes (by August 2017 there were 1.5 million public bikes in the city) alongside much less predictable and seemingly ‘ungovernable’ mobile subjects. Boundless freedom and citizen-led conduct became not only the strength of PBSS 2.0 but also its key weakness, a fact that was picked up by the international news media. For example, a commentary in the ‘New York Times’ noted that,

In many urban areas, carelessly parked bikes encroach on limited sidewalk space already crowded with pedestrians and street vendors. Bikes with missing wheels and shattered frames pop up in bushes and rivers. Cases of theft and accidents have made newspaper headlines¹².

Indeed for local government, since late 2016, the environmentality of PBSS2.0 rapidly turned into a problem. This was backed up by our interviews and observations. For example, a local transportation researcher noted that during peak time,

Main underground and bus stations are full of sharing bikes passing or parking... People feel unsafe and unable to walk; even buses cannot approach stations. In popular attractions, bikes park everywhere disorderly... or occupy all parking spaces previously for citizens’ private bikes.

Thus, other modes of mobility (such as bus or pedestrian) have been rendered less mobile

¹² <https://cn.nytimes.com/opinion/20170411/how-the-chinese-navigate-urban-sprawl/dual/>

because they can no longer move easily and safely. The creation of a frictionless cycling mobility has created friction and more immobility in other modes of transportation and their users.

For many interviewees, the crisis of PBSS 2.0 – in the absence of any state regulation – relates to the failure of the market in managing the oversupply or misuse of public bikes, as one local transportation scholar lamented:

[PBSS 2.0] use streets, sidewalks to over-distribute their bikes and run their own business... What is the difference between them and the street vendors who occupy sidewalk to sell barbecue...? You can complain about vendors... but why do you have to tolerate and even thank [PBSS 2.0]?

PBSS 2.0 as a dispositive emerges from the gray areas, disconnections and distances between existing bureaucratic divisions that renders it ungovernable within the remit of different authorities. This lack of territorialisation, distance and disconnection manifested within local government as an unwillingness to act due to no clear responsibility to do so. Although in late 2017, the SMPG's committee of transportation was asked to lead the governance of PBSS, it became difficult to coordinate because of different authorities' administrative concerns and political interests. For example, a senior official of committee abdicated responsibility by stating a lack of expertise: 'the management of sharing bike relates to lots of the management of public spaces and planning, but we are not experts...'. Nonetheless, another planning official present in the meeting confided that, 'our leader never thinks this is our problem...', since the fixed and physical developments remain more important. Precisely because local authorities escape from the responsibilities of delivering national policies of green mobility or sharing economy, they become unwilling to provide normative and holistic governance.

Combined with previous state failures in relation to the governance of PBSS 1.0, a strong narrative emerged to support a privately-led and neoliberalist governance of PBSS 2.0 in which the privatized “forms of political-economic governance premised on the extension of market relationships” can maintain the dynamic development of PBSS2.0 (Larner, 2000, p. 5; Spinney & Lin, 2018). Numerous interviewees noted that there was a perception that state-led regulation would only ‘suffocate’ the innovation and ‘healthy’ market of PBSS 2.0. Clearly the diffuse and loosely coherent dispositive of PBSS2.0 results in what McLaren’s and Agyeman’s (2015) call, shifting or redefining “the boundary between public and private” through sharing consumption. This has caused, as Rose (1999) and Jessop (2003) illustrate, a confused accountability and tension of governing within/beyond the state and related failure of state or market. Indeed, deliberation in governing PBSS 2.0 is underpinned by a problematic dualism between the state and the market that ignores the complicated nature of a more horizontal dispositive with remotely interconnected heterogeneous elements.

However, from early 2017, both public and private providers were under pressure to regulate and govern the chaos of PBSS 2.0. By August 2017 the Shanghai municipal government called a halt to any new bikes appearing on the streets and drafted a set of regulations for the operation of PBSS 2.0. The Draft of “Regulations on the Internet Bike Rental Management of Shanghai Municipality”, gave city districts powers to ask firms to reduce the numbers of bikes, manage their parking, or cease operations altogether. This state-led intervention was targeted at disciplining PBSS operators who responded by having operatives organize bikes on the street, and creating preferred parking zones. However there emerged a new hierarchy as operators sought to discipline overly-mobile subjects through the smartphone app.

Whilst there was always the possibility since launch that leading PBSS2.0 providers could use

their credit system, data, and index of users collected through the APP to develop self-governance and self-responsibility, this function was brought to bear on users much more forcefully in 2017. For example, the CEO of Mobike sought to implement a ‘carrot and stick’ credit system in which users’ good or bad behaviors can earn or lose them credits¹³. By combining the credit system with the big data that Mobike can gather from its APP and GPS, PBSS 2.0 thus begins to exercise a digitalized environmentality that, for example, seeks to encourage citizens to report uncivilized behaviours by other users, and report lost or broken bikes through GPS and online reporting. This digital environmentality aims to make citizens more responsible for the ‘civilization’ of cycling, and make their “activities become extensions and expressions of informationalized and efficient material–political practices” (Gabrys, 2014, p. 41). It refers to shaping, as Datta (2018, p. 132) concluded, “‘hashtag citizenships’ – the production of idealized urban citizens through a range of interactive apps, infographics...”. Such environmentality seeks to exercise the responsabilisation of individuals through practices of self-monitoring and citizen surveillance. As such it represents a further shift within the dispositive from a horizontal to vertical relationship between users, operators and the state as downward pressure is applied; and a corresponding set of relations between users that shifts from reciprocity or anonymity to surveillance. These relations remain distant and mediated through ICTs to a large degree.

However, from our interviews and observation, these modes of self-governance exist mainly in theory, and fail to comprehensively govern mobile subjects to perform a more regulated and ‘healthy’ landscape of green mobility. One key reason for this failure refers to the dominant rationality of market competition between PBSS 2.0 enterprises and similar mobility (such as E-bikes). As a local planning official said in interview: ‘If Mobike’s management is too strict,

¹³ <http://sh.people.com.cn/BIG5/n2/2016/0830/c134768-28915612.html>

and then everyone can just use [other PBSS]... If there is no common rule, and then they can only apply the law of the jungle.’ This reference to the ‘survival of the fittest’ means the more widely used and popular brand will survive, which given the market conditions, was deemed more important than developing workable governance and regulated environmentality. Such a viewpoint fails to focus on the public interests, (unequal) right to the city and mobility, and socio-cultural meaning of cycling for citizens’ everyday life that are core to the ‘Publicness’ of PBSS. In order to remain competitive and not unduly affect the flexibility of the PBSS2.0 offering, both private and public sector actors attempt to transfer the major responsibilities and failures of the ungovernable situation on to users and their communities through ‘nudging’ (Whitehead et al 2015). Many interviewees noted that the relative failure of these initiatives was not due to its voluntary, distanced and uneven nature, but rather that citizens were incapable of being civilized: ‘If people’s degree of civilization can improve, all social operations can be much better...’. Such accusations underplay the ways in which the mobile conduct of subjects emerges through their emplacement and interconnectedness within the new dispositive.

We argue that a binary deliberation between the state-led and privately-led governance of PBSS 2.0 fails to understand and respond to the contingent dispositive of PBSS 2.0 that as Agamben (2009) and Gailing (2016) illustrate, involves a much more complicated interaction and dynamic network between heterogeneous socio-political elements, subjects and objects than simplified market behaviors or state-led re-regulation. Certainly it is clear that the smartphonised PBSS creates an unfixed and hybrid mobility, and dynamic and irregular flow of mobile subjects that not only changes the connections and distances between people, but also reshapes the forces and connections between places, authorities and different vehicles (Bærenholdt, 2013; De Souza e Silva, 2006). Without fostering a more inclusive or collaborative governance to deliberate the digitalized ‘governmobility’ of new flexible

connections between diverse mobile subjects and objects, it is unclear what kind of collective rationality or socio-political consensus can be produced.

6. Conclusion

In this paper we have shown how a shift from PBSS 1.0 to 2.0 in the context of Shanghai reformulates governance relations and represents the emergence of a dispositive driven by the effects of new forms of mobility. In particular we have been concerned to foreground two related processes. The first is the reformulation of the governmental dispositive that coalesces around PBSS in Shanghai. We have shown how the relations within the dispositive shift from more hierarchical, bounded, regulated and state-led to relations characterised by a more dispersed, disconnected, horizontal and distant form. Secondly, we have shown how this dispositive both produces and is produced by an emergent environmentality (Gabrys 2014) that manifests in a fixed territorially in PBSS1.0 and a more fluid and deterritorialised digital environmentality in PBSS2.0.

Importantly we draw attention to the importance of the intersections between virtual and physical mobility in reshaping environmentality and dispositive. As De Souza e Silva (2006) has theorized, the place-engaged feature of hybridized mobility has blurred the boundary and segmentation between the digital and physical spaces. Our case study offers an illustration of this as PBSS 2.0 architectures of extraction build new connections and correlation between the sharing economy and green mobility in the form of 'place-engaged' smartphonized network and location-free PBSS 2.0. By way of conclusion we want to draw out some of the key insights in relation to the ways in which social relations between different actors are reshaped in this process.

Firstly we argue that the relationship between state and private operators is reformulated with the development of PBSS2.0. Whilst the nature of this relationship within PBSS1.0 was one characterized by state power, in PBSS2.0 this relationship becomes flatter as private operators cease to be subject to either local territorial concerns or the legal requirements of central government. However it is clear that the emergent 'unruly' environmentality of PBSS2.0 pushes back upon the dispositive in the form of pressure to create more governable mobile subjects. The result is a form of loosely hierarchical relations where the State encourages private operators to act. As such private PBSS2.0 operators rather than the local state become the loosely disciplined executors of State power.

Secondly, we highlight the shifting relations between state and citizens. In the context of PBSS1.0 we described a pastoral relationship where bike sharing became a territorialized (if unsuccessful) tool to articulate and legitimate the relations between the local state and citizens. Here central state power is devolved to the local. However, in PBSS2.0 we see the local state largely removed from the dispositive as planning functions and any pastoral relationship are removed from the dispositive in favour of a locative logic premised upon emergent use. Thus the relation between state (both local and central) and citizens is all but severed. Even in the process of attempting to 'civilise' PBSS2.0, the local state is backgrounded and planning authorities try to distance themselves.

Thirdly, there is a reshaping of relations between private operators and citizens. In PBSS1.0 private companies manifest as depoliticized servants of the state, their role defined as one of delivering infrastructure. In PBSS2.0 a new set of private operators become a more direct service provider, even though this relationship is mediated through the smartphone. In the final reported phase of PBSS2.0 the private operators become executors of state power and capital accumulation as they attempt to discipline users in the search for profitability and ongoing state

legitimation. Again, this relationship is deterritorialised and conducted through the digital environmentality of the smartphone.

Finally within the dispositive and through the emerging digital environmentality there is a reorientation of citizens with each other. In PBSS1.0, relations between citizens are characterized by anonymity, physical presence and reciprocity mediated through fixed PBSS1.0 infrastructure. In PBSS2.0 citizens become oriented toward each other as they are encouraged through the PBSS app to conduct surveillance on other users. This suggests a less reciprocal and more distant relationship mediated through a digital environmentality.

Clearly there are profound implications for urban governance because of the ways in which intersecting mobilities reshape governance as a more contingent, uncertain and ongoing accomplishment (Baerenholdt 2013; Braun 2014). Certainly it is no longer possible to separate the physical and virtual (Sheller & Urry 2006) when trying to understand the internal dynamics and external manifestations of governance which in our example are characterized by more fluid, more voluntary, less localised, flatter, and physically distant relationships.

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