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What is shared in shared bicycles? Mobility, space, and capital

Abstract:

As sustainability has become a keyword for urban mobility, cycling and bicycles are often perceived as an inherently progressive force for a more environmentally friendly and equitable society. This article joins the growing scholarship that critically examines bicycle mobility as a socio-technical system with complex effects on urban lives. Drawing on long-term fieldwork on mobilities in the urban areas of the Pearl River Delta area in South China, this ethnography of the platform-based, bicycle-sharing programs unpacks the complex politico-economic, spatial-infrastructure, and social entanglement that has shaped this reincarnated form of pedalled mobility when China has moved away from a kingdom of bicycles to a country of cars in the past two decades. I argue that dockless bicycle-sharing programs emerged a capitalist technological fix for a socio-spatial condition produced by the process of urban transformation. Shaped by marketing strategies common in the sharing economy, bicycle-sharing companies capitalize on an ambiguous perception of public space. Yet this individualized form of mobility reproduces rather than disrupts the existing social hierarchy. This study sheds light on the importance of a socio-technical critique of the assemblage of infrastructure, capital, and technology to produce more sustainable forms of urban mobilities.

Keywords: bicycle-sharing; mobility; urbanization; public space; technological fix; the sharing economy; China

As sustainability has become a keyword for urban mobility, cycling practices have attracted significant attention from policy makers, consultancies, technological companies, and activists around the world. Cycling is seen as a low-carbon, agile, and healthy option for combatting such urban challenges as traffic congestion, air pollution, and obesity. Cycling is also understood as a way of promoting accessibility to urban space and achieving socio-spatial equity (Emanuel, Schipper, Oldenziel 2020; Oldenziel and Trischler 2015). In other words, cycling and bicycles are often perceived as an inherently progressive force for a more environmentally friendly and equitable society.¹ This view was reflected in the decision by the United Nations Environment Programme to crown Mobike – one major bicycle-sharing program in China – ‘Champion of the Earth 2017 for Entrepreneurial Vision’ for ‘exploring market-driven solutions to air pollution and climate change’. Two years later, however, dumpsites full of colourful shared-bicycles in outskirts in China, the photos of which have been sensationalized in international newspapers, have raised questions about overproduction and waste.

This article presents an ethnographic study of the dockless, bicycle-sharing programs in China as an intervention in dialogues about bicycles, technology, political economy, and urban development. It suggests that to understand the intended and unexpected consequences of cycling practices, it is necessary to go beyond the act of cycling or the bicycle per se and examine bicycle mobility as a socio-technical system that interacts with other systems of mobilities in a larger political-economic context. This conceptual approach is well illustrated in from the analysis of automobility by scholars of mobilities studies.

Automobility is a hybrid social and technical system comprising multiple interlocking elements (Featherstone, Thrift, and Urry 2005; Sheller and Urry 2000; Urry 2004). The rise of automobility is not merely the result of technological development,

Fordism, and consumerism (Sheller and Urry 2006). Visions, agendas, and meanings of automobility are closely shaped by political projects at specific historical junctures (Edensor 2004; Koshar 2004; Seiler 2008). Mobility is not merely about movement; streets and moorings – sedentary, material infrastructures – are often an indispensable part of any mobility regime (Cresswell 2010, 18; Hannam, Sheller, and Urry 2006). Options and trajectories of movements are made possible by networks of human and non-human infrastructures, from roads and parking lots to mechanics and car dealers (McShane 1994; Zhang 2019). Yet different social positionalities – whether gender, class, race, or family – condition uneven accessibility to auto-centric infrastructures and configure different forms of mobilities (Miller 2001), which often leads to the marginalization of other forms of transportation, the immobility of certain social groups, the entrenchment of an urban-suburb divide, and the reproduction of social inequality (Emanuel, Schipper, Oldenziel 2020; Norton 2008; Sheller 2015, 2016).

Stehlin (2019) extends this conceptual approach to his investigation of the cycling movement in American cities. Looking into discourses and conflicts regarding bicycle infrastructures, neighborhood-level redevelopment, and relationships between different communities and social groups, Stehlin shows that the ‘ascent of bicycling is not the simple struggle of popular activity against the automobile behemoth’ (xv). Instead, cycling practices often comprise a terrain of contestation in which an ‘institutional fix’ of urban space in the process of gentrification intersects with racial and class politics as American cities pursue local and regional competitiveness in the post-Fordist era (see also Sheller 2016). As Stehlin’s study well demonstrates, the conceptual approach of mobility as a socio-technical system allows researchers to integrate human and non-human actors, showing how cycling practices depend on a series of interwoven institutions, the built environment, social relations, and power dynamics, which leads to

intended as well as unexpected socio-economic effects and diverse experiences among different groups.

Many existing studies, like Stehlin's, examine cycling movements emerged as a critique of automobility in societies with an entrenched car-centric transit system. But studies of cycling in societies less dependent on cars are much limited. The case of China provides an intriguing intervention as it has a different historical trajectory in terms of its urban mobility systems than countries like the United States. Bicycle-centric mobility was the dominant form of movement in cities from the 1960s to 1980s, and China was still known as a kingdom of bicycle up to the 1990s. Automobility is a phenomenon of the twenty-first century as the country's rising middle class have passionately embraced private car ownership and the ensuing driving practices (Zhang 2019). Against the rapidly growing private car ownership, shared bicycles, commonly known as *gongxiang danche*, started to populate streets, sidewalks, and other public spaces in the mid-2010s. These colourful, QR code-bearing bicycles-for-hire have no docking stations; (un)locking and payment are done on the users' smartphones (see figures 1 and 2).² Many users lauded these platform-based bicycle-sharing programs for the convenience they brought to their lives. Yet in their effort to de-naturalize the narrative of convenience, scholars of technology remind us that convenience is less about saving time and labour than about achieving a structured feeling resulting from the reorganization of one's life entailed by the changing social norms as social and technological transformations take place (Santos 2018; Shove 2003; Wajcman 2015). What kind of social transformations have made the bicycle-sharing programs possible and desirable and riding shared bicycles convenient? How does mobility under a bicycle-sharing scheme differ from the ownership-based system of old? What spatial-infrastructural order makes bicycle-sharing possible, and what political and economic forces shape this spatial-infrastructural order? How do the

experiences of mobility produced through bicycle-sharing among different groups converge or diverge? And in what ways does the bicycle-sharing programs in China contribute to our understanding of the complexity and politics of mobility in the era of the sharing economy?

[Figures 1 and 2: Shared bicycles on the street. Photos by author, 2019]

To address these questions, I draw on long-term fieldwork primarily in Guangzhou but also in Shenzhen and Foshan in the Pearl River Delta area, one of the two highly industrialized regions of China.³ My interlocutors, mostly born between the 1960s and the 1980s, can be divided into two groups according to socio-economic status. One group includes middle-class professionals with whom I have been in contact for more than a decade, as well as their friends and colleagues. The other consists mostly of taxi drivers and janitors: I intentionally took multiple taxi rides so that I could talk to the drivers, who spend a lot of time in the streets, about their encounters with shared bicycles, and I talked to janitors who watched and maintained any open spaces in mid- and low-income residential complexes. In addition to over a decade of observations and interviews regarding urban transformation, I made repeated comparative observations of the usages of shared bicycles on the main streets, at crossroads, and in open spaces at different times of the day, in different weather, during the week and over the weekend. Data from this fieldwork is complemented by news reports and commentaries that outline the trajectories and marketing strategies of some of the bigger bicycle-sharing companies.

In the rest of the article, I explore the infrastructural, techno-capitalist, and spatial entanglement that conditioned the rise of bicycle-sharing programs. I argue that dockless bicycle-sharing programs emerged in the late 2010s, intriguingly, as a capitalist

technological fix for a socio-spatial condition produced by the process of urban transformation. With large-scale infrastructure supporting cycling having gradually disappeared, mobilities by cars and public transits have largely replaced the ownership-based, bicycle mobility. As the built environment has become pedestrian unfriendly and accessibility to public transit is not always easy, shared bicycles provide an option for short-distance traveling. Riding on the waves of sharing economy, technological companies that run bicycle-sharing programs and their investors took advantage of an ambiguity surrounding the question of who should be entitled to claim or use public spaces. Despite this ambiguity, bicycle-sharing companies' use of public spaces seemed to have been naturalized by old cycling habits carried forward from yesteryear. By promising a hassle-free experience, bicycle-sharing programs captured the pulse of urban life and the desire for mobility free of worries about such things as availability, logistics, maintenance, and theft, which was epitomized in the discourse of convenience. However, the convergence in discourse does not mean the convergence of socio-spatial experiences of mobility. Different social groups experienced the mobility afforded by bicycle-sharing differently: the way that mobility was embedded, and the kinds of socio-economic realities and spatial imaginations of connectedness that ensued, were class specific.

In short, bicycle-centric mobility as a socio-technical system is shaped by – and which in turn reshape – ways of life, subjectivities, technological development, environments, and power dynamics. The old, ownership-based form of bicycle mobility continues to shape the new, shared-bicycle mobility in subtle ways. Unlike in many other places, bicycle-sharing programs in Chinese cities have not meant to challenge auto-centered mobility. Instead, they provide an individualized form of spatial fix to mobility obstacles shaped by the process of uneven urban development. The capitalization of such mobility, which imagines the application of a technological fix to a spatial-social issue,

seems to buttress rather than dismantle existing social hierarchies. The process of social reproduction therefore, intriguingly, echoes that described in Stehlin's and others' accounts of the cycling movement in American cities, pointing to the need of a socio-technological critique of the structural forces and processes that shape as well as limit the potentiality of cycling as a sustainable way of life.

The marginalization of cycling-based mobility amidst rapid urbanization

The 1990s witnessed a major change in the Chinese government's development agenda. In its efforts to stimulate economic growth, the state shifted its focus from rural areas to the cities. Urbanization, which has gravitated towards land development, has since that time been seen as a major impetus for national socio-economic progress (Hsing 2010). The government's active pursuit of urbanization has not only caused cities to grow rapidly in terms of both size and population but has also led to a remaking of the urban landscape that **embodies an increasingly stratified society**.

The city of Guangzhou is exemplary of this process. Compared to the late 1980s, the urban area in present-day Guangzhou has tripled in size, while the number of residents has doubled. Like other Chinese cities that have seen such immense growth, specific built environments have also expanded in scale. Many of these changes have not merely been the results of pragmatic adjustments to accommodate the ever-growing numbers of people and cars. They have also been shaped by an economy of scale and spectacle that aim to produce a neatly organized spatial order with impressive visual effects.⁴

Tianhe district, the 'Central Business District' (CBD) located to the east of Guangzhou's old city, is a good reflection of such a planning practice. It hosts gated complexes and high-end office buildings and shopping malls that cater to upper-middle-

class professionals and families. Unlike the old city, with its signature labyrinthine alleys, street-level shops, and walkable neighbourhoods, the CBD has wide boulevards (often with eight to ten lanes), overhead footbridges, and high-rises (Zhang 2016). However, the older parts of the city were not exempted from the scale economy. Massive reconstruction started to take place in the city's historical centre in the 1990s, with old buildings bulldozed to make room for subway lines and to yield prime locations for real estate (re)development. City blocks have been widened and lengthened as well. Streets greatly expanded in width as barriers that used to separate bicycle lanes from car lanes were removed. Visually grandiose, however, these reshaped urban spaces have often become unfriendly toward pedestrians and cyclists.

Meanwhile, the ever-developing city encroached upon adjacent market towns, villages, and agricultural land. Some of the land, thanks to their adjacency to the newly developed CBD and other downtown areas, has been turned into the kind of gated complexes that appeal to middle-class homeowners. But many other encroached villages, which are far away from the city centre and often poorly connected to municipal public facilities such as water and waste collection, have become home for migrant workers mostly from rural areas because of the cheap rents.⁵ As locations close to public transportation now house mostly high-priced business and residential buildings, urban residents with less means have been driven to the urban periphery and enclaves that lack easy access to public transportation, providing a fertile ground for illegal scooter businesses.

With distribution of urban space being increasingly coded in socioeconomic terms in the process of city expansion and remaking, accessibility to transportation resources has also become stratified. Automobility, whether it is with privately-owned cars or through ride-hailing, has been the preferred form of mobility for the urban middle class

(Zhang 2019). Mobility centered around privately-owned bicycles has become an undesirable method for daily commutes. As locations close to public transportation now house mostly high-priced business and residential buildings, urban residents with less means have been driven to the peripheries in government subsidized housing and urban villages that lack easy access to public transportation. In these underconnected areas, as the municipal government would not typically build public transportation facilities, privately supplied scooters have often served as an important mode of transportation in addition to cycling and walking. As part of the informal urban economy, such scooter businesses have typically been operated by rural-to-urban migrants and highly stigmatized in official discourse about crime and street security. As a result, they were made illegal in the name of public safety in Guangzhou in 2007 (Qian 2015). But the Municipal Administration Law Enforcement, commonly known as *chengguan*, which is responsible for policing the use of public spaces, often turns a blind eye to scooter businesses at peripheral areas. After all, scooters do provide a critical service to inhabitants of urban villages, where many *chengguan* staff also reside.

The hierarchical forms of urban mobility have been made possible not only by the pragmatic needs and desires of urbanites from different socioeconomic backgrounds but also by drastic changes in transportation infrastructures. If cars were must-haves for suburban families in the post-war United States, bicycles were their counterparts for urban Chinese households from the 1970s to the 1990s (Christensen 2017; Rhoads 2012). Perhaps the clearest sign of the significance of bicycles during this period is the fact that they were one of the three most coveted items (along with sewing machines and wristwatches) among newly-weds (Gerth 2020; Rhoads 2012). Bicycle ownership in Guangzhou peaked at roughly two per household in the first half of the 1990s.⁶ For many

of my interlocutors, their bicycles were the main vehicle with which they moved for school, fun, and other social activities in the 1980s and 1990s.

As bicycles represented the main form of mobility for ordinary citizens before the 1990s (Gaubatz 1995), other human and non-human infrastructures were in place to support it. Bicycle lanes were common in the cities. A line of trees often divided bicycle lanes from automobile lanes, and the respective lanes were often of equal width (see figure 3; see also Rhoads 2012). Bicycle lots, often guarded, were a common part of schools, workplaces, and residential areas. The streets abounded with small workshops and even one-man operations that repaired and serviced bicycles for a nominal fee. Many residents in Chinese cities learned how to perform basic maintenance on their bicycles, such as tuning the brakes and restoring the chain.

Beginning in the second half of the 1990s, with urban expansion and redevelopment, bicycle-based mobility gradually receded in dominance while other public transportation options, from buses to subways, emerged and underwent substantial development. Since the turn of the millennium, the ever-increasing prevalence of private car ownership has challenged bicycle-based mobility. When automobility began to acquire prestige and become the dominant form of mobility among the middle and upper classes (Zhang 2019), urban planners started prioritizing cars over bicycles and pedestrians. Infrastructure was constructed in ways that favoured broad boulevards and overpasses to walkable streets. Bicycle-friendly infrastructures gradually disappeared. Bicycle lanes were absorbed by auto traffic (see figure 3). Bicycle lots were converted into car parks and recreational spaces. In places like CBDs, it is now easier to find car parks than bicycle-mooring facilities. Small bicycle repair businesses have been replaced by a few special shops that offer a wide range of bicycles, accessories, and services with much higher price tags (see Christensen 2017).

Decades of city (re)making has thus configured, to use Larsen's (2017) phrase, a 'low-cycle context' in which bicycles and cycling were denied large-scale spatial-infrastructural support. My interlocutors, regardless of their socio-economic statuses, considered cycling dangerous and unhealthy, as the city had become so much bigger and more polluted due to excessive traffic. As public transits—from buses to subways—have been equipped with air conditioning, many also cited the 'hot' and 'humid' weather in southern China as one of the main deterrents for cycling. Intriguingly, it was in such a context that bicycles struck back, this time emerging as a dockless, shared, and embedded form of mobility that had assumed a different assemblage of discourses, capital operations, and power structures.

[Figure 3: Former bicycle lanes, previously separated from car lanes by rows of trees, now used by buses and cars. Photo by author, 2019.]

When a technological fix meets venture capital

The issue of uneven access to various forms of urban mobilities is a result of a complex process shaped by governmental strategies, urban planning, capital accumulation through land development, and existing urban forms. Yet, this socio-political situation has often been rendered as a technical issue concerning the 'last kilometre' (*zuihou yi gongli*) challenge. The 'last kilometre' challenge, which in e-business terminology refers to the distance between the last dispatch centre and the end user, is often the most expensive part of delivery logistics. In the context of transportation systems, it refers to the distance between the last public transportation station and the user's destination. As much as public transportation networks are extensive, there is still a gap between, for example, a rider's getting off the bus and their arriving home. For many, especially if

they have consumptive power, that last kilometre is what determines their decision to use either public transportation or a private car.

Dockless bicycle-sharing programs have emerged as an ostensibly affordable and technological fix for the last-kilometre challenge. This fix is technological, not least because these programs are fixing a social-political situation that has been rendered technical, but also because they are typically established by tech companies and more technologically enhanced than previous and some existing iterations of bicycle-sharing programs. In the past, coin-deposit systems or credit-card systems with designated docking stations were common (Fishman 2016; Ploeger and Oldenziel 2020). Some newer bicycle-sharing programs such as e-bicycles in Madrid allow bicycles to be recharged at their docking stations (Munkácsy and Monzón 2018). In comparison, the popular shared bicycles in urban China, still pedal-driven, are characterized by the absence of docking stations and the presence of a smartphone-based (un)locking and payment system that includes integrated tracking. Users need only download the relevant app to their smartphones, select a bicycle, scan its QR code to unlock it, and ride away; after using the bicycle, they can drop it off anywhere. The cost of hiring a shared bicycle depends on the duration of use, and payment is transacted electronically via the mobile app.

Ofo was one of the first bicycle-sharing companies in China. Established in Beijing in 2014, it originally targeted college students in an effort to make campuses in the country car-free (*Duan chuanmei*, 3 Nov. 2016). Part of Ofo's fleet had been donated and recycled from abandoned bicycles. This initiative quickly spread beyond university campuses. Launched in Shanghai slightly after Ofo, Mobike quickly took off to become one of the country's biggest bicycle-sharing companies.⁷ Soon, dozens of companies were offering similar dockless bicycle-sharing services, each with its own app and signature

fleet colour. The apps would typically be linked with one of the two most popular mobile payment methods in China: Alipay or Wechat Pay.

The rapid rise of bicycle-sharing programs would not have been possible without the rise of the platform-based sharing economy and the intervention of venture capital. The sharing economy, as an umbrella term, comprises a wide range of activities, some more technologically enhanced than others, across multiple terrains (Davies et al. 2017). Some platformized sharing practices emphasize reciprocity, care, and resocialization (Arcidiacono, Gandini, and Pais 2018; Schneider 2018; Gibbings, this issue). With the involvement of venture capital, however, platform-based sharing practices have become a business model that aims for profit maximization. Sharedness often becomes a form of value extraction and flexible accumulation that ‘monetize[s] human effort and consumer assets’ (Bearson, Kenney, and Zysman 2019, 62). In searching for the start-up that could become the next Facebook or Alibaba, venture capital turned to bicycle-sharing programs in China, which had become ‘one of the most-invested industries for private equity, venture capitalists and angel investors’ in the late 2010s (*South China Morning Post*, 25 Oct. 2017). In less than two years, Ofo and Mobike managed to gather hundreds of millions of dollars from high-profile foreign and domestic investors over several rounds of capital-raising (*Financial Times*, 17 May 2017). These bicycle-sharing programs differ from companies like Uber and Airbnb in that they have made no promise of individual entrepreneurialism. In terms of property structure, the bicycle-sharing programs are similar to Zipcar but not Uber or Didi (see Chen’s and Xing’s articles in this issue).

The intervention of venture capital has given the platform-based, bicycle-sharing programs in China a configuration that is very different from bicycle-sharing programs in other societies. Like many platform companies, bicycle-sharing enterprises emphasized the technological advantages from the use of algorithms based on mobility data and

adopted a ‘growth before profit’ strategy. As Srnicek (2017) points out, ‘the more numerous the users . . . [of] a platform, the more valuable that platform becomes for everyone else’ (45). Although there is no proof that user-accumulation strategy is generally effective (Horan 2017), from the perspective of investors and platform operators, the volume of users remains key for profit. With support from venture capital, bicycle-sharing companies engaged in fierce competition, following the tenets of ‘market share first, profit later’ and ‘winner takes all’ between 2016 and 2018.

To this end, two specific strategies were commonly deployed to attract users. The first one was to be inexpensive. A deposit ranging from RMB 99–299 (roughly US\$14–43 in 2019) was required at the time of registration. Some of the companies, especially the newcomers, waived that deposit requirement in order to increase subscription. For many bicycle-sharing programs, it cost RMB 0.50 (roughly US\$0.07) per thirty-minute ride. The other strategy saw individual bicycle-sharing companies try to fill open, public places with as many of their own bicycles as possible so that users could not find other companies’ bicycles. Rebalancing – allocating shared bicycles to different locations – has been a key challenge for bicycle-sharing programs around the world. The Chinese bicycle-sharing companies claimed their algorithms allowed them to effectively identify where bicycles were in high demand, typically places near shopping malls, bus stops, and subway stations, and in front of office buildings in the CBDs (Mobike and Tsinghua Tongheng 2017). One of the few ways for rebalancing is to collect and move bicycles to such high-demand sites. While some bicycle-sharing companies did outsource this task to individual truck or van drivers and paid them by the number of bicycles they relocated, their main strategy was to deploy new bicycles before 2018. With millions of dollars injected from venture capital, companies placed as many bicycles in as many locations as possible across major cities. This strategy also enabled these companies to circumvent

issues such as theft, vandalism, and maintenance, all of which would enter their accounting books as the ‘cost of operation’ and be shifted to the consumers in the long run. Backed by venture capital, shared bicycles grew rapidly within three years. Beijing alone had 2.4 million shared bicycles in 2017, and out of the 23 million shared bicycles in the country by early 2018, 95 percent of them belonged to Ofo and Mobike (*South China Morning Post*, 28 Dec. 2020). Judging by the streets of its big cities, China seems to have reverted to a bicycle kingdom.

Capitalizing on the ambiguity of public space

To accommodate millions of new bicycles in cities with the disappearance of large-scale infrastructural support such as bicycle lands and bicycle parks, bicycle-sharing companies capitalize on the ambiguous nature of public spaces in socio-political practices in Chinese cities. Discussions regarding public spaces often invoke specific intellectual genealogies and a spatial-political culture that have been shaped by and have shaped the urbanization processes of European countries and other societies since modern times. The idea of ‘public’ is not merely a concept of property ownership; rather, it is embedded in discussions of citizenship, equality, and power. Streets, parks, and other public places are the focal points of action, tension, and struggle.⁸ Yet, as scholars point out (Huang 1993; Kaviraj 1997), this concept of public space with its spatial-political connotations were not automatically applicable in countries with different philosophical traditions and historical trajectories such as India; and the adoption of this concept was a key part of colonial struggles.

Like in India, China had its own spatial-cultural traditions and idioms in which public space did not have much political or symbolic significance.⁹ In the process of urbanization during the first three decades of the twentieth century, public spaces were

constructed as open leisure areas and sites of contentious politics (Shi 1998). The conceptual separation between the public and private spheres, as social and ideological constructs, had been introduced but never fully developed.¹⁰ Practices regarding public space became highly politicized when the party-state has been continuously used public spaces for state rituals since it came to power. Squares and parks, for example, often serve as performative and educational spaces where state-orchestrated ceremonies such as National Day parades take place (Hung 2007; Lee 2011). Genovese and Li (2017) thus suggest that the idea of public space in this context should probably be understood as ‘official space’. In the new wave of urbanization since the 1990s, spatial governance, with the goal to produce a “modern” and orderly city, has further complicated the concept of and practices related to public space (Qian 2019). Public spaces are spaces of control and discipline. Any collective action with a contentious purpose mounted in a public space is subject to strict state surveillance. Meanwhile, in line with Jacobs’s ([1961] 2002) sidewalk ballet, public spaces have always been the venue in which mundane lives unfold. As various scholars have documented (Farquhar 2009; Oakes and Yang 2020; Zhang and Sun 2014), public parks, streets, and squares have been used by senior citizens for various kinds of activities, including exercising, dancing, and conducting matchmaking exercises for their children. Public space is hence space of encounter and conviviality (Richaud 2018).

In short, the idea of public space is an ambivalent one, and its multi-dimensionality and plasticity remain under-conceptualized in social sciences. There is no pre-existing cultural or legal framework – not even for the government – by which to determine who has the right to access public spaces and what actions are permissible there. The issue of accessibility is contingent on a given activity, its timing, and the general political atmosphere. Over years of talking to urbanites and observing actions in

public spaces, I have noticed that many urbanites would see public spaces as spaces belonging to the government when they see a disruptive action or a display of resistance such as protests in streets and squares. But when activities are about leisure such as dancing, many urbanites, especially their participants, would perceive public spaces as ‘shared, open’ spaces, the ownership of which should be claimed by no one.

Even governments have performed inconsistent, even contradictory actions regarding the rationale and regulations that define what constitutes legitimate access. For instance, *chengguans* - the government agency in charge of maintaining order in public spaces - do not typically intervene when senior citizens exercise or conduct matchmaking in public spaces, but they are notorious for confiscating the goods and vehicles of street vendors and driving vendors away from streets (Hanser 2016). If monetary transactions are what makes street vending illegitimate, some matchmaking and leisure activities that involve money-service exchange are clearly tolerated. Bicycle-sharing programs are meant to be profit-making businesses. Yet *chengguans* do not routinely or systematically intervene bicycle-sharing operations. That said, they sometimes remove shared bicycles from certain areas. Meanwhile, municipal governments in Shenzhen and Guangzhou marked out separate, metre-wide bicycle lanes on many roads in an effort to accommodate the growing number of shared bicycles in 2018 and 2019.

This by no means idealizes norms and practices regarding public space in Euro-American cities. However, when it comes to the use of public space in such situations as shared bicycles and their docking stations, it typically involves negotiations and deliberations among multiple stakeholders during the planning process in the United States and Europe (Stehlin 2019). In the case of bicycle-sharing in China, I have not found any proof that bicycle-sharing companies have ever obtained official permission to use public spaces prior to the rollout of bicycle-sharing program. Instead, local

governments intervened after bicycles programs had been operating for several years. For example, Guangzhou's municipal government held weeks-long clean-up campaigns to remove large numbers of shared bicycles from public spaces, claiming the shared bicycles had overwhelmed the city and led to disorder in mid-2019.¹¹ In late 2020, it issued new regulations, allowing shared bicycles to be placed in designated areas in public spaces but providing no explanations how designated areas would be selected or marked. In other words, by encroaching public space, bicycle-sharing companies produced a de facto situation with vast amounts of shared bicycles, the popularity of which pressured the government to accept its use of public space with regulations and conditions coming afterwards.¹²

Such de facto encroachment of public space was also enabled by the lack of coherence and clarity regarding the accessibility of public space among the bicycle users themselves, particularly middle-class ones, according to the conversations with my interlocutors and ordinary citizens' posts on social media. Attitudes change depending on one's role as a cyclist, a car driver, or a pedestrian. Dr Wang is a good case in point. He lives in the old part of the city full of narrow alleys and drives to work at the hospital located near the intersection of two eight-lane roads. In a conversation on bicycle-sharing in early 2019, Wang happily described to me his experience of using a shared bicycle to tour around the city of Wuhan when he was there for a medical conference. 'It was so easy to use. I just downloaded the app. Then I just jumped on whatever bicycle was nearby. The bicycle was easy to ride. It was just so convenient to go sightseeing with shared bicycles', Wang concluded. However, in a group lunch several months later, Wang could not help but complain that he had recently almost been late to a surgery because someone with a shared bicycle rode in the middle of the alley and his car could not pass him. Then, as he approached the hospital, he almost ran over a cyclist when the

latter suddenly cut into the car lanes without giving any signal. ‘These shared bicycles are so annoying. They compete with cars!’ Wang commented. This sentiment was immediately echoed by other drivers at the table with similar experiences.

From a driver’s perspective, my interlocutors – middle-class professionals and taxi drivers – would complain about cyclists disregarding traffic rules and riding however and wherever they please, sometimes taking up vehicle lanes, other times going in the wrong direction, in addition to dropping off bicycles outside designated locations. As pedestrians, they were unhappy that shared bicycles forced them off the sidewalk and into vehicle lanes. As residents of gated communities, they perceived shared bicycles as a source of danger for their children in the playground and thus forbade shared bicycles from entering the gated areas.

As users of shared bicycles, however, they welcome the expediency of having bicycles strewn everywhere, always within arm’s reach (of which more below). They explained away shared bicycles’ invasion of public space in two ways. First, cycling practices cultivated back when Chinese cities were bicycle-friendly have continued to inform and shape today’s popular perception of what is considered acceptable. As mentioned, these professionals have often grown up with cycling as a part of their ordinary routines. Some have said that they use shared bicycles much as they used their own bicycles growing up. Although they felt annoyed sometimes by cyclists’ behaviour in the streets, my interlocutors have commented that it is ‘natural’ and ‘necessary’ for shared bicycles to occupy streets, squares, and other open spaces in the city. As Dr Wang put it, ‘where else can they cycle?’

The second factor is that for users of shared bicycles, it is the bicycle-sharing companies’ responsibility to iron out the legality around the use of public spaces. My interlocutors have never questioned whether bicycle-sharing companies are entitled to use

public spaces like they are parking lots. Instead, they read governments' silence on the reality that streets were shared bicycles and governments marked out bicycle lanes, as mentioned, as signs that municipal governments approved or at least were tolerant of the bicycle-sharing operations. Some of them also took a pragmatic attitude toward these shared bicycles. Some interlocutors have told me that 'no one would monitor' where people use and leave the bicycles. Noting that these programs have brought convenience to the masses, Dr. Wang asked me rhetorically, 'How can the government penalize something that benefits the people?' It is precisely this ambiguous and contingent nature of public spaces that venture capital and bicycle-sharing companies are allowed to continuously exploit and profit from, without even having to privatize it.

'Because it is convenient'

Unlike in the Euro-American contexts in which the discourse of sustainability frames the meaning of bicycle-sharing programs, users of shared bicycles in China share a discourse of convenience. Even my taxi driver-interlocutors, who generally are not fond of shared bicycles as they obstruct traffic, have admitted that they can understand why bicycle users – who include the taxi drivers themselves – would enjoy the convenience. As mentioned, convenience shall be understood as a structured feeling resulted from specific social practices and changing routines in everyday life. In the case of bicycle-sharing in China, the discourse of convenience highlights how shared bicycles, through technological fix and the high-coverage strategy, enable a form of cycling mobility as large-scale, spatial-infrastructural support for cycling has largely disappeared from cities.

For my interlocutors, convenience refers to primarily easy access enabled by technological design. To illustrate what they mean by 'easy access', some interlocutors have juxtaposed the platform-based bicycle-sharing programs with other forms of

bicycle-sharing. The municipal government of Guangzhou had, in fact, introduced its own bicycle-sharing program. The docking stations for this program were, however, only scantily distributed, often in places that were far away from popular work and residential areas. Users had to go through the hassle of looking for docking stations, which was especially frustrating given that they did not have the means to know if the docking stations were already occupied or completely empty. Instead of completing the transactions on their smartphones, users need to purchase a special card sold only at a few government-designated spots, which my interlocutors considered troublesome and time-consuming. In comparison, my interlocutors are thrilled that all that is needed to use the platform-based bicycle-sharing service is a mobile phone. Regardless of where they are, their bicycle-sharing apps will show them where bicycles are available. As the platform-based bicycle-sharing companies have placed a huge number of bicycles in public spaces, users of platform-based programs usually can easily find a nearby bicycle to unlock with their phones, which they can then simply desert at their destinations.

The experience of convenience also comes from the comparison between owning a bicycle and using a shared one. Maintenance is one major concern. Bicycles require routine maintenance for regular use. Tasks ranging from fixing a flat tire to frame alignment to tuning the brakes and oiling the chain, though not particularly challenging, require skills, tools, and labour. In the absence of small businesses that used to provide quick and cheap maintenance services, as mentioned earlier, keeping a bicycle can become a nuisance. Using shared bicycles instead of owning one's own allows cyclists to offload the hassle of maintenance. Theft is another headache. Bicycle owners would know that often it is not enough to just put a lock on one's bicycle; one should also leave it in a safe place. With the bicycle-friendly infrastructure of the past, finding guarded parking for a bicycle was not difficult, especially at a small charge. With such parking

spaces disappearing, however, many cyclists have had to leave their bicycles in the streets without any racks to secure them, increasing the risk of bicycle theft. Bicycle-sharing programs effectively erase this problem, shifting the worry of theft and vandalism from individuals to bicycle-sharing companies.

What my interlocutors have described is essentially a form of hassle-free cycling that resonates with their past cycling experiences from a time when bicycle-centric infrastructure was still in place: the easy access and drop-off points and the round-the-clock availability offered by bicycle-sharing programs almost invoke the feeling of owning one's own bicycle, but without the headache of maintenance and theft. Such convenience illuminates how bicycle-sharing programs have recreated, to some degree, a familiar experience of being able to move around urban spaces despite the changing spatial-infrastructure context. Yet while this sense of convenience is shared by different social groups, cycling practices themselves often differ from class to class in the highly stratified cities.

Hierarchy of cycling mobilities

The marginalization of urban bicycle-centric infrastructure has not simply led to the marginalization of cycling. Once an item and a practice of necessity, bicycles and cycling have become markers of status (see also Christensen 2017). **This is not unique to China. From the United States to India, members of the middle-class professionals actively engage in perceived high-status cycling practices as a lifestyle choice, while people from lower social strata continue to rely on bicycle-based mobility in their everyday lives (Anantharaman 2016; Sheller 2015; Stehlin 2019).** In the emerging new cycling culture in China, high-status cycling is not just about the kind and brand of bicycle, equipment, and clothing in the stratified consumer market. Engagement in perceived high-status cycling

practices is mobilized by narratives related to the environment, personal well-being, self-fulfillment, and technology. What distinguishes high- from low-status practices also depend on where, when, why, and with whom cycling takes place.

An example of a desirable practice, according to my observations and conversations with my interlocutors, is the use of cycling to bring a family together for some quality time. Middle-class parents cycle with their children on weekends and holidays. They drive to parks or the countryside, where there are designated bicycle lanes in which they can ride safely. Another high-status practice is cycling for self-improvement and self-maintenance. This includes spinning in a gym for health purposes. Increasingly, urban professionals get into cycling in the countryside, as it is perceived as an exercise that cultivates one's mental and physical strength. According to one of my interlocutors, Ms Ling, who owns a tourism company, one of her most popular packaged tours is to take cyclists away from cities and into nature. In her experience, cycling is increasingly becoming a popular team-building activity, especially for companies with young employees. In addition, she helps organize challenging cycling tours to advocate for environmental consciousness and to fundraise for charity. For those who engage in this form of cycling – whether they see it as a personal hobby or participate in it as a group activity – their equipment, from bicycles to such accessories as drinking bottles, includes various high-tech features designed to provide safety, comfort, and efficiency during their cross-country rides.

In the world of middle-class professionals, bicycle-sharing has its niche. Professionals like Dr Wang who have travelled to another place for work may now take advantage of shared bicycles for sightseeing purposes. While these professionals may never use shared bicycles for excursions such as those organized by Ms. Ling for self-improvement or team-building purposes, they do use them to run errands from time to

time, or to cover the distance between the subway station and their own doorstep. In addition, bicycle-sharing may be part of a shared social activity – for example, riding with colleagues back and forth to a restaurant for lunch on a workday.

The key, however, is that cycling is only one of many transportation options. In fact, many of my middle-class interlocutors, especially those who own cars, have admitted to using shared bicycles only occasionally. Any reason, from the weather to feeling tired to simply not feeling up for it, can lead them to drop the idea of cycling and turn instead to a taxi or other form of transportation. People like Ms Ling who organize and participate cycling tours in mountains to promote environmental consciousness would never cycle to work in cities. Cycling to work is also often considered inappropriate for people who work office jobs. One becomes very sweaty in the summertime after cycling, and, as my interlocutors have told me, most workplaces do not have shower facilities, so it would be entirely inappropriate to walk into an office covered in sweat. Some female interlocutors insist that, in addition to the embarrassment of perspiration, it would be very difficult to ride a bicycle while wearing a business suit and high-heel shoes.

Middle-class professionals' rhetoric concerning cycling usually revolves around family, leisure, health, and the desire to link their urban lives with nature. These elements are usually missing from the pictures depicted by lower-class users. Janitors and taxi drivers, for example, describe shared bicycles as a part of their daily commute between work and home, usually in urban villages. In the past, they had to either walk for half an hour to get to the nearest public transportation station or use a scooter that cost RMB 5–10 per ride. Bicycle-sharing has proved to be the cheaper and better form of mobility for that proverbial last kilometre. Now they can easily find a shared bicycle and be home in less than fifteen minutes, and at a cost of RMB 0.50. Such users tend to be very price

sensitive; they would usually register with a bicycle-sharing program during a promotion, when deposits are waived. Some interlocutors have expressed joy about not having to deal with scooter operators anymore.

In sum, under the generic notion of convenience are subsumed the individual practices and spatial-temporal imaginations of bicycle-sharing users of different class backgrounds. For members of the middle class, cars are the preferred choice for work-related mobility, as auto-centric mobility is perceived as more timely and efficient (which, ironically, is often not the case) and more in line with middle-class culture, appearance, and professional conduct. Cycling is embraced by middle-class Chinese in the domains of leisure, consumption, and individual self-improvement, and bicycle-sharing offers a hassle-free convenience that fits their occasional cycling needs. Cycling is a lifestyle choice, something that is fun and enjoyable. In comparison, cycling remains closely related to the productive lives of lower-class bicycle-sharing users: it is a necessity, or a desirable option, for going to work or returning home. Leisure as a temporal-spatial arrangement in the lives of such workers rarely surfaces when they articulate their experiences with shared bicycles. In this sense, even though the middle class and the lower classes may use the same shared bicycles and apps, bicycle-sharing programs are by no means an equalizing instrument in the increasingly stratified society of contemporary China.

Conclusion: Hassel-free cycling, gig economy, and urbanization

The core concern of this article is to understand how a promise of technological intervention to improve urban mobility has managed to generate hype and uncritical praise among technological companies, the media, and many citizens, as well as how that promise is delivered. As mobilities studies have neatly demonstrated, urban mobilities

shape and are shaped by specific social and political processes. Transportation options are not merely about the individual vehicle – whether car, subway, or bicycle – and its technological potentiality. Mobilities that are centred around a specific transportation option are deeply embedded in an assemblage of institutions, ideas, people, and infrastructures. The effects of such mobilities are often contingent on such an assemblage.

In taking up this idea, this article has sought to explore how platform-based bicycle-sharing programs are shaped by interactions among planning practices, capital, technology, and users' habits and perceptions, and how these programs work in a low-cycle context resulted from rapid urbanization that has reconfigured the social, spatial, and infrastructural order in Chinese cities. More specifically, bicycle-sharing programs had emerged as a technological fix, offered by tech companies riding on the waves of the sharing economy, for the last-kilometre problem that essentially stemmed from an unequal distribution of spatial resources among urban residents. Powered by venture capital and adopting the strategy of maximizing users typical in the sharing economy, bicycle-sharing companies managed to navigate through the low-cycle context and became popular by providing an experience of convenience for users across socio-economic boundaries.

Yet, despite its popularity, urbanites rarely commit to the cause of sustainable growth in their daily use of shared bicycles. While they take part in the new cycling culture for health, leisure, and advocacy, my research has shown that no middle-class car owners have changed their car-centric lifestyles. This is consistent with the findings of researchers in other parts of the world where shared bicycles are a substitute for public transit and walking but not for cars (Fishman 2016; Munkácsy and Monzón 2018). **In the China context, what has been further marginalized by the rise of the bicycle-sharing programs is the illegal scooter business serving residents living at the margin, a business**

that, not without irony, has managed to elude municipal government and *chengguan* control.

While the media and many users lauded the platform-based bicycle-sharing programs for their technologically innovative design, the specific form of mobility enabled by shared bicycles has entrenched instead of mitigating the uneven spatial development and unequal distribution of mobility resources. Tech companies have placed much higher percentages of shared bicycles in downtown areas and CBDs than in urban villages and other low-income residential complexes on the peripheries of cities. Their predatory use of public spaces is essentially a form of capitalization without privatization. Their strategies to maximize market shares also generated other issues, such as waste (figure 4), that this article has not been able to address. Noticing these issues is not to deny bicycle-sharing's potential as a viable form of urban mobility in the face of climate change and deteriorating living environments. Yet such problematic issues are not inherent attributes of bicycle-sharing programs. They are the result of a specific assemblage of capital, technology, governance, and practices. To turn bicycle-sharing's potential contribution to sustainable development into a reality will require **more socio-technical critique of the current mode of urban development and further progressive experimentation.**

[Figure 4: Abandoned shared bicycles piled up on the sidewalk. Photo by author, 2019.]

Notes:

1. In this article “bicycle” and “bicycle” refer to pedal bicycles.

2. *Gongxiang danche* refers specifically to the dockless shared bicycles. Some municipal governments have the traditional bicycle-sharing programs with the docking stations (more details later; see also Christensen 2017), but their scales are much smaller and they are much less popular. In this article, unless otherwise stated, terms such as “shared bicycles” and “bicycle-sharing” in the China context refer to the dockless ones as they are commonly understood in Chinese.
3. Guangzhou has long been an administrative-spiritual centre throughout Chinese history, while Shenzhen was developed as a city in the post-1978 era. A historical market town, Foshan is less populated than the other two, and its public transportation system less developed. These cities all have a sizable middle class and have drawn migrant workers in large numbers from other parts of the country. With Guangzhou as the analytical focus, I juxtapose Guangzhou with the other two in my data analysis, which allows me to see how important the existing or changing spatial-infrastructure order is in shaping the actual usage and experiences of bicycle-sharing. This research has obtained ethical approval from the Research Committee at City University of Hong Kong.
4. This economy of scale and spectacle allows officials, technocrats, planners, and other professionals to strategically brand cities as metropolises that are somehow distinct from their rival urban centres. It provides symbolic capital to municipal governments and opportunities to those with money and political connections (Zhang 2016).
5. The formation of urban villages (*chengzhongcun*) is due to the dual landownership system. Depending on location, timing, and the dynamic in the process of negotiation during the conversion, the built environments and socioeconomic

statuses of urban villages may vary significantly, as discussed in a large body of literature.

6. See Guangzhou Statistics Bureau (1993, 1995, 1997, 1999, 2001, and 2002).
7. <https://Mobike.com/cn/timeline/> (accessed 28 August 2019). It is noted that Mobike's first CEO used to work in the top management of Uber in Shanghai. Yet by 2018 Ofo had run into serious financial trouble, and Mobike was bought by another Chinese platform company.
8. A large body of literature have been devoted to the topic of public space. To begin with, see Low (2000), Low and Smith (2006), and Warner (2002).
9. I cannot provide here an in-depth discussion of the historical origin and philosophical development of this topic. For the earlier spatial-political tradition in China, see Abramson (2006) and Lewis (2006).
10. For debates on public-private separation in relation to a different spatial understanding of the relations between state and society, see Huang (1993).
11. For discussions of such campaign-style governance, see Liu et al. (2015) and Wang (2020).
12. Mobility practices have complicated the politics of public space. Similar de facto encroachment of public space can also be observed with privately own cars that need parking spaces in Chinese cities (see Zhang 2019).

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