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Thea Marie Valler

Riding, Hailing, and Sharing

Re-configuring Transportation through
Platform Mobility in Urban China

NTNU
Norwegian University of Science and Technology
Thesis for the Degree of
Philosophiae Doctor
Faculty of Humanities
Department of Interdisciplinary Studies of Culture



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Preface

Summary

During the mid-2010s, China experienced immense growth in mobility services enabled by smartphone applications such as dockless bicycles and different ride-hailing services. This development sparked controversies related to public obstruction, resource use, work relations, and companies' responsibilities vis-à-vis their users. Parallel to this criticism, several researchers, media outlets, governmental bodies, and companies found the same mobility services to be innovative, future-oriented, and sustainable. Amidst these opposing narratives, this doctoral thesis questions the extent to which these new technologies disrupted or reconfigured the urban mobility system in Beijing. The thesis qualitatively explores the two most extensively used application-based mobility services in China; dockless bicycles and ride-hailing, which I refer to as «platform mobility.»

The main objective of this thesis is to understand the embedding of platform mobility in everyday life and the relations between platform mobility companies and regulatory bodies. The empirical material is based on secondary sources, user- and expert interviews conducted during a six-month fieldwork in Beijing in 2019. The empirical material is mainly analyzed by drawing upon concepts, perspectives, and theories from Science and Technology Studies (STS) as well as sustainability transitions studies and the mobilities turn. Drawing on domestication theory and perspectives from the mobilities turn, I seek to make clear how users 'make technology their own' through practices, symbolic and cognitive work, and the experienced and embodied practice of movement. These perspectives provide a comprehensive approach to various ways platform mobility has become embedded by analyzing it through sociotechnical configurations.

The empirical findings of this monograph are divided into five chapters. Chapter 5 argues for the need to understand the evolvment and embedding of new transport systems, technologies, and practices in relation to older and existing ones; thus, the importance of understanding previous mobility systems to understand the contemporary situation. The chapter revolves around the reconfiguring of symbolic connotations, practices, policy approaches, and infrastructural conditions of the bicycle and the car in China over the past 70 years. Chapter 6 unpacks local and national regulatory approaches to platform mobility over time and shows how platform mobility companies build relations with governmental bodies to impact policy.

In doing so, platform mobility actors position themselves to align with national technological ambitions. Chapter 7 demonstrates the fluidity of car ownership norms and sheds light on everyday practices and the role of the car in certain life events. Chapter 8 explores the embedding of ride-hailing and dockless bicycles in everyday life. While I understand domestication processes through technologies and practices that preceded these app-based mobility services, I also demonstrate that platform mobility has implications for justice and brings about new symbolical configurations, practices, and demands. Chapter 9 concentrates on the case of ride-hailing, which I understand as a gendered space. I argue that ride-hailing vehicles, users, drivers, and platforms should be understood as hybrids, shaping practices of self-protection.

The thesis contributes to a novel understanding of the role of platform mobility in an urban Chinese context and questions the extent to which transport innovations such as these are positioned to challenge existing, unsustainable modes of transport. By investigating practices and meanings tied to different modes of mobility, I argue that, in the coming years, platform mobility will be an add-on rather than a challenge to car ownership. In this way, the thesis contributes to both STS and mobility scholarship by critically scrutinizing platform mobility technologies in an urban context and by demonstrating their potential adverse effect on consumption of mobility services as well as the sociotechnical processes that produce such outcomes.

Acknowledgments

Findings a nice allegory or quote to introduce the acknowledgments should be effortless for a mobility researcher. However, as I am sitting here, working without a brake, I cannot find my bearings, and my head feels like a bag of air. Regardless of how much I wreck my brain and try to ignite myself to pedal forth ideas to chain this writing process to – something that could work as a reflector for writing a PhD – my brain is just idling. Nevertheless, it is time to shift gear, anchor up, and give this head a rest; because this marathon is finally reaching its finish line. Now, I will pave the way for quick releasing this thesis out of the baby’s seat and onto the open road. *Bon voyage!*

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Trondheim, June 2023

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1. Introduction

In the spring of 2015, a new type of bicycle started to appear at university campuses in Beijing (Z. Liu et al. 2019)¹. These bicycles had a lock integrated into their wheels, which could be opened using a smartphone application. Compared to the traditional, stationed-based public bicycle-sharing schemes, these bicycles were “dockless” and provided by private companies. For many years, cycling has been a common way of getting around university campuses in China. With the introduction of dockless bicycles, students were no longer dependent on their own bicycles, which were prone to theft. The first dockless bicycles were provided by the company Ofo, and they had a striking yellow color. Soon after their introduction on university campuses, dockless bicycles quickly gained popularity and their use spread to other areas. Competing companies launched bicycles in various colors, such as orange and silver, blue and white, and green. Some first appeared around tech hubs in big cities, while others appeared in smaller cities.

At the time when the first dockless bicycle companies were launched, many Chinese, particularly urban Chinese, were familiar with using smartphone applications when traveling from one place to another. Companies such as Didi Dacha and Kuaidi Dache, which were launched in the early 2010s, started their business by offering customers the opportunity to book official taxis through their apps. Later, they opened up for hailing private vehicles.² Thus, companies providing taxi booking and ride-hailing services became well-established and represented significant changes in the taxi industry, although they were less visible in the cityscape compared to the dockless bicycles.

¹ There are several authors in the list of references who have the same family. Therefore, the initial letter has been included in the in-text references in cases where two or more authors share the same family name. In cases where two or more authors share a family name and the first initial letter of the given name is the same, the given names are included in brackets in addition to the initial of the given name.

² In addition to using private vehicle, ride-hailing companies also rely on cars for rental companies (H. (Huiqin) Jiang and Wang 2020). For the sake of simplicity, I refer to the non-taxi vehicles used by ride-hailing companies as “private vehicles” in this thesis.

In this thesis, I use the term “platform mobility” as an umbrella term for dockless bicycles, ride-hailing, and their digital ecosystems. This use of platform mobility aligns with the contributions of Stehlin, Hodson, and McMeekin (2020); Frey (2022); Gibbings, Frey, and Barker (2022). The term also covers other app-based means of transport, such as car sharing, dockless e-bicycles (commonly referred to as e-bikes and the term used hereafter in this thesis), and dockless e-scooters. However, ride-hailing and dockless bicycles are the most widely used forms of platform mobility in China (F. Jin 2020) and are the two cases I have researched for this thesis. I mainly refrain from using “shared transport/mobility,” given the dubious presence of “sharing” in this practice (Belk 2014; E. Huang 2017; Schor 2016; Spinney and Lin 2018). A detailed explanation of this choice of wording is given in Section 2.2. in the following chapter.

Intensified commercialization of such partly new transport services poses a number of sociotechnical questions. Issues such as public obstruction, affordability, pollution, and exclusion from (precarious) work opportunities are pressing. For this reason, there is a need to consider a number of components in tandem when studying platform mobility. While this thesis cannot thoroughly cover all the above-mentioned aspects, I seek to contribute a comprehensive perspective on platform mobility. In particular, the thesis focuses on negotiations of regulations, user practices, gendered aspects, and mobility justice implications of implementing different platform mobility services in an urban context.

Innovations in the transport sector often receive much attention, which can largely be ascribed to the difficulty of decarbonizing the transport sector. In this regard, platform mobility is no exception. In China and beyond, platform mobility companies seek to position themselves as part of the solution to a more sustainable mobility system (Borak n.d.; Didi Chuxing 2017; Mobike 2017; Shijia 2018). Also, various academic contributions have framed platform mobility as contributing to sustainability (e.g., Cohen and Kietzmann 2014; A. (Aoyong) Li et al. 2020). However, the sustainability of platform mobility is co-dependent on various issues, such as infrastructure, regulations, and practices. Thus, it is important to remain critical of the sustainability claims of these rapidly growing privatized companies. At the same time, an intermodal transport system may be the greatest hope for decreasing carbon emissions (Kemp, Geels, and Dudley 2012), in which platform mobility—in one form or another—may be one part of the solutions needed to transform transport and mobility systems in a more sustainable direction.

Certainly, without reducing transport emissions, reaching global climate goals will be exceedingly difficult (United Nations 2021). Moreover, reducing the growth in global climate gasses will be nearly impossible without contributions from China, which is the biggest emitter of CO₂ (Friedlingstein et al. 2020), and where pollution from the transport sector continues to be a major challenge in terms of public health and national emissions (J.-W. Hu and Creutzig 2022).

Platform mobility is an interesting case for studying changes in the mobility system for two main reasons. First, mobility systems are exceedingly difficult to decarbonize (Geels et al. 2012; Holden, Gilpin, and Banister 2019), which relates to the durability of infrastructure, spatial planning, established mobility practices, symbolic aspects, economic structures, and industries (Geels et al. 2012; Holden, Gilpin, and Banister 2019). Due to the stability of transport systems and the need to increase the speed of transitions (Sovacool, Hess, et al. 2020; Markard, Geels, and Raven 2020), it is important to study cases where mobility practices do change quickly to understand how they influence stability and change in current and future mobility practices and systems. Second, policymakers and researchers have identified an intermodal transport system as central to building a more sustainable mobility system (Kemp, Geels, and Dudley 2012). Therefore, as platform mobility increasingly gains endorsement, such actors may play an increasingly prominent role in the future of mobility. At the same time, a verdict has still not been reached on whether platform mobility companies are a part of the solution or are adding to the mounting challenges of the urban mobility sector, particularly congestion, accessibility, increased carbon emissions, and local air pollution (Diao, Kong, and Zhao 2021; J.-W. Hu and Creutzig 2022; S. Wang and Noland 2021). Therefore, it is questionable whether “sharing” can solve the “hardest case” (Geels 2012) of decarbonization, namely the transport sector, and to what extent platform mobility represents deep-rooted changes. The rapid introduction of transport technologies may also have unforeseen social consequences. Researchers have identified gaps in the literature that address platform mobility through a sociotechnical lens (Sutherland and Jarrahi 2018) and implications for transport-related social exclusion (Clark and Curl 2016). Therefore, while there is a need for rapid transitions, we also need to slow down and explore the implications for everyday mobility and social reproduction.

Further, there has been a call for looking beyond the Western world within transition studies, Science and Technology Studies (STS), energy social sciences and humanities (Invernizzi et al. 2022; Korsnes, 2015; Mormina 2019; Sovacool et al., 2020), and mobilities research

(Aouragh 2011; Cresswell and Uteng 2008; Sheller & Urry, 2000). In this respect, understanding changes in the Chinese mobility system from a sociotechnical approach is apt. Dockless bicycles and ride-hailing in Beijing are interesting and relevant starting points for approaching platform mobility in China. Apart from being the two types of platform mobility most widely used in China (F. Jin 2020), ride-hailing and dockless bicycles shed light on two different forms of mobility practices. In addition, Beijing is an intriguing context to approach ride-hailing and dockless bicycles. Beijing has tight restrictions on vehicle ownership and use (P. Li and Jones 2015; Zhuge et al. 2020); they are possibly some of the strictest in the world. Several of the biggest platform mobility companies have offices in Beijing, and as the capital, politics at the local level are of great national importance. Therefore, municipal policy approaches in Beijing's urban transport sector often have ramifications for the rest of the country.

Before moving on with the discussion, I want to pause briefly and clarify to whom I am writing, my contributions to literature, and my approach to empirical and theoretical developments. As this is a thesis in STS, I draw on frameworks from STS and seek to contribute empirically to this discipline. I also draw on literature from, and seek to contribute to, the "mobilities turn" in Social Sciences and Humanities (SSH). I do not aim at theoretical or conceptual developments but instead want to combine frameworks that complement each other and contribute to a richer understanding of platform mobility. While the empirical findings are contextualized through the literature on governance and urban mobility in China, I do not seek to provide a comprehensive perspective on Chinese policymaking. Moreover, I have also tried to write the thesis in a manner that does not require special competence in Chinese society and governance.

When I started my research project in March 2018, I found that explaining the phenomena I was studying to people unfamiliar with the context in China required far more elaboration than it does today, particularly in the case of dockless bicycles. Dockless bicycles were relatively rare in Western countries; for example, there was no similar transport technology in Norway at the time. Furthermore, Norway prohibited ride-hailing between 2017 and 2020 (NRK 2021). Today (2023), the conveniences and annoyances of dockless micro-mobility are much closer to everyday life in Norway, as e-scooters have started to fill the streets. Parallel debates to those seen in China since 2016 on oversupply, safety, and waste have started to appear in both the national and local press (Hall Larsen and Hind Sveen 2019; Lund 2020).

Despite the legalization of ride-hailing and the introduction of dockless e-scooters in Norway, it is still difficult to grasp the size of the phenomenon in China. However, some statistics may help in this respect. Particularly during the heyday of dockless bicycles in 2016 and 2017, China's big cities were scattered with bicycles (Ibold, Nedopil, and Retzer 2018) (Figure 1). The number of dockless bicycles grew from 2 million in 2016 to 23 million in 2017 (T. K. Gu, Kim, and Currie 2019). At its peak, one of the biggest companies, Mobike, claimed to have about 25 million daily rides (Russell 2017). In addition, the number of dockless bicycle companies grew quickly; from a couple of companies in early 2016 to over 70 in July 2017 (Ministry of Transport of the People's Republic of China 2017a).



Figure 1. Dockless bicycles near Wudao Kou metro station, Beijing, close to several university campuses. August 2019.

Uber may be a more familiar company in a Western setting, yet Didi Chuxing (the result of the merger of Didi Dache and Kuaidi Dache), also simply known as Didi, was the biggest ride-hailing company globally in terms of daily rides in 2020 (Tirachini 2020). There are different estimates of the number of ride-hailing users in China. Estimates from 2018 range from 299 million (L. Ma et al. 2019) to 450 million users (Tirachini 2020) (for estimates, see

J. Y. Chen and Qiu 2019; Gu and Huang 2019). Regardless of the exact number, the trend seems to have continued to increase in recent years. According to a report from the State Information Centre in China, “the share of ride-hailing in total taxi passenger traffic increased from 9% to 37%” from 2015 to 2019 (J.-W. Hu and Creutzig 2022, 377). The ride-hailing giant company Didi operates in 400 cities, covering 33 provinces (H. Yang and Xia 2021). In 2016, the number of Didi drivers were 21 million (Didi Chuxing 2017). Didi has also expanded globally and operates in a number of countries, including Russia, Egypt, Japan, Australia, and Mexico (Didi Global 2023). By June 2021 Didi Global was valued at 68.49 billion dollars (Hussain, Wang, and Sun 2021). While Didi has remained the market leader for several years, as of September 30, 2022, there were 286 ride-hailing companies in total (ChinaNews 2022). There has also been a vast amount of capital flow into the dockless bicycle and ride-hailing companies alike, and they have been able to raise astonishing amounts of capital, often in the region of hundreds of millions of USD at a time (Reuters 2018; Suzuki and Zhou 2021).

The discussion in this introduction serves to give an impression of the scale of the platform mobility sector and how rapidly it has become a part of everyday life in China. In the following section (1.1), I present the research questions and map out the structure of this thesis.

1.1 Research question and thesis structure

The statistics presented in the preceding part of the Introduction give a sense of an “explosion” in platform mobility. However, this understanding should be nuanced. In news media covering China, dockless bicycles and ride-hailing services are often described in terms such as “sudden flood” (Taylor 2018), “popping up” (van Mead 2017), and “disruptive innovation” (CNBC 2021) (for a discussion, see Marsden and Reardon 2018). Such descriptions might not be incorrect *per se*, given that they reflect experiences. However, in this thesis, I also aim to show how platform mobility, like any mobility system, is embedded in practices, culture, digital and physical infrastructure, and technologies. In other words, I seek to understand the

mutual shaping of technology and society, including how technologies shape and are shaped by the society and context in which they develop.

Throughout the thesis, I want to unpack both the continuation and change in platform mobility. I understand platform mobility as a sociotechnical system that builds on and extends established practices and materials. Hence, instead of just seeing platform mobility as something completely new and disruptive, I try to illustrate how platform mobility also represents continuity. This is not to say that platform mobility does not represent a break in the Chinese mobility system. Mobility practices associated with platform mobility are given new meanings, take new spatiotemporal forms, involve new constellations of technology, provoke regulatory change, and produce and reproduce inequalities. Furthermore, platform mobility is becoming increasingly entangled with the Chinese state apparatus as an actor seeking to take part in solving various transport-related issues. Perspectives from transition studies and studies of infrastructure are well-positioned to analyze such processes of a sociotechnical *system*, while perspectives from the mobilities turn and domestication theory reminds us of the need to understand the embodied, spatiotemporal dimensions, cognitive, and shared representations involved in mobility and technology *practices*.

Against this backdrop, I take dockless bicycles and ride-hailing in Beijing as cases and seek to explore the overarching research question:

- How has platform mobility been embedded into China's mobility system, and which changes has this development brought about?

In order to provide a fuller understanding of platform mobility's embedding and use, there is also a need to understand established travel practices and technologies. For this reason, I also investigate the role of the car in Chinese society. When it comes to platform mobility, the thesis' exploration is twofold. First, I explore the role of platform mobility companies as actors in regulatory processes that apply to them and their alignment with the political ambitions of the Chinese government. Second, I aim to understand embedding in everyday practices and how intensified commercialization of mobility impacts everyday life. However, the uptake of platform mobility has undoubtedly not been friction-free. Therefore, I focus on one such case, namely how ride-hailing reconfigures and reproduces gender relations and produces safety work.

I address these key themes through the following sub-research questions:

RQ1: How have cars and bicycles been reconfigured (politically, socially, and culturally) since the establishment of the People’s Republic of China, and to what extent does platform mobility shape the understanding of private car ownership?

RQ2: How do platform mobility companies negotiate regulatory processes, and to what extent are they actors in state-led technological ambitions?

RQ3: How is platform mobility embedded into everyday life, and what implications does this process have for justice, safety, and constructions of gender?

The empirical chapters of this thesis have a non-chronological structure focused around the research question. Chapters 5 and 7 are devoted to the first research question; Chapter 6 attends to the second research question, and the third research question is addressed in Chapters 8 and 9 (see Table 1 below). I outline the structure and connections between the empirical chapters in more detail in what follows.

Table 1: Relationship between research questions and empirical chapters

	RQ1	RQ2	RQ3
Chapter 5	X		
Chapter 6		X	
Chapter 7	X		
Chapter 8			X
Chapter 9			X

Beginning from research question 1, Chapter 5 focuses primarily on secondary sources and traces how both car ownership and bicycle ownership can be understood through China’s

modern history. This historical backdrop serves two main functions. First, it provides background information on how the car and the bicycle have been treated politically by the Chinese Communist Party (CCP) from the Maoist era (1949-76) until today. Second, it provides background information for understanding vehicle ownership's symbolic and practical importance in contemporary China. In Chapter 7, I pick up this thread by focusing on symbolic and practical aspects of car ownership in Beijing. In particular, the chapter sheds light on the role of car ownership in relation to social situations and important life events such as marriage. I examine in depth the role of ownership in order to shed light on why the car remains such a central asset, despite the inconveniences of the car as a means of transport in Beijing. Furthermore, understanding ownership is important for two main reasons. First, it is important for the understanding the transport technologies, including the ideas relating to these transport technologies, upon which platform mobility is built (i.e., the sociotechnical underpinnings of platform mobility). Second, it is important in order to underline the symbolic and practical differences between ownership and platform mobility.

I address the second research question in Chapter 6. The Chapter sheds light on how platform mobility has been increasingly regulated and formalized and discusses platform mobility companies' efforts to negotiate a highly unpredictable policy environment. The chapter elaborates on strategies platform mobility companies use to influence policy. Furthermore, the chapter illustrates how platform mobility actors are increasingly interwoven into the sociotechnical web of planning practices.

After having covered the role of private ownership and negotiations relating to regulations, I turn to the third research question in Chapters 8 and 9. In Chapter 8 I examine the day-to-day experiences of platform mobility. The chapter details how intensified commercialization impacts the negotiations on, and use of, platform mobility. The chapter examines user practices and situates platform mobility through sociotechnical configurations. Chapter 9 contains an in-depth examination of how ride-hailing may produce and reproduce gender relations. While Chapters 8 and 9 shed some light on the mobility justice implications of platform mobility, Chapter 9 pays particular attention to this issue by focusing on the case of ride-hailing.

Before the above-mentioned chapters empirical chapters (5 to 9), I first contextualize the findings of this thesis through central issues of platform mobility in Chapter 2. The thesis does not have a dedicated chapter to previous research. Instead, I have integrated previous

research into the discussions in Chapter 2 and at the beginning of chapters 7, 8, and 9. Chapter 3 presents and elaborates on theoretical frameworks and concepts that guide the analysis. In Chapter 4, I expand on methods and methodology. The final chapter, Chapter 10, synthesizes and discusses the empirical findings.

2. Issues with Platform Mobility in China

While the preceding chapter, Chapter 1, has introduced some of the opportunities and challenges associated with platform mobility, this chapter provides a fuller discussion of these topics and introduces new ones. The chapter presents concepts of relevance for the empirical focus of this thesis, and I seek to clarify my position in relation to them. This chapter starts by exploring why transport is a complicated sector to decarbonize (Section 2.1). In Section 2.2, I discuss central terms for this thesis. I briefly discuss the idea of “smart mobility” and the concept of Mobility-as-a-Service, and while recognizing that this is an encompassing debate, I have chosen to give relatively short accounts. Thereafter, I present the terms “sharing economy” and “shared mobility/transport,” and a critique of these concepts and their alternatives, and then conclude with the terms I use in this thesis, namely “platform mobility,” “ride-hailing,” and “dockless bicycles.” The chapter also provides some background on central technologies that make up platform mobility and their business models (Section 2.3). I continue the discussion from Chapter 1 by highlighting some hard questions facing platform mobility, namely sustainability and just mobility, in section 2.4. Furthermore, I discuss the difficulty of governing platform mobility in section 2.5. The section also expands on how we can understand approaches to platform mobility regarding societal and political goals in China. While an encompassing question, I touch upon some ways of understanding the Chinese political system in section 2.6 before summarizing the chapter in section 2.7.

2.1 Automobility: the crux of decarbonization

It is widely acknowledged that a rapid shift from a carbon-intensive transport system dominated by private cars is necessary (Hopkins, García Bengoechea, and Mandic 2021). The concept of “sustainable mobility” has existed for about 30 years. Still, energy use and emissions have continued to increase (Holden et al. 2020): “At present, the transport sector consumes approximately one-third of our final energy and probably causes more

environmental and social problems than any other sector” (Holden, Gilpin, and Banister 2019, 2). Reduction in emissions from the transport sector has been particularly difficult to achieve (Schwanen, Banister, and Anable 2011). Automobility may even be the hardest case with regard to decarbonization (Geels et al. 2012; Holden, Gilpin, and Banister 2019). Transport planning has met considerable challenges: pollution, congestion, and space. Nevertheless, the system for automobility has remained remarkably intact (Banister 2008; Kemp, Geels, and Dudley 2012), which raises the question of why is that the case?

Decarbonizing the transport sector is particularly complicated as the system is deeply ingrained in a number of stabilizing mechanisms (Geels et al. 2012) related to infrastructure, urban layout, industries, and economies, as well as habits, desires, and needs (Holden, Gilpin, and Banister 2019). Transport infrastructure is also durable and costly, and the present system is thus shaped by previous investments (Hommels 2005). A self-reinforcing system of automobility (Urry 2004) has been created over several decades, whereby increased car use has become more of a necessity than a matter of choice (Owens 1995). The dependence on automobility is closely connected to a number of industries, including the extraction of fossil fuels, manufacturing, and construction, which implies that major economic interests are tied to the status quo (Owen 1995). In turn, policymakers are connected to the automobility system through taxes, jobs, and industry interests (Geels 2014). The interconnectedness between these aspects also seems to reinforce each other, which stabilizes a transport system where the private car dominates, which makes up the *automobility regime* (Geels et al. 2012; Hoffmann, Weyer, and Longen 2017).

Even with the political will to reduce car dependence, it is difficult to implement effective policies to reduce driving. For example, car use is not very sensitive to increased fuel prices, which indicates that fuel taxes alone might not effectively reduce car use (Brons et al. 2008). This lack of price sensitivity speaks to the fact that driving and car ownership cannot be understood independently of social and cultural values. The car holds important symbolic meanings (Sovacool and Axsen 2018) and in many cultures, social expectations related to mobility can hardly be solved without the car (Schwanen, Banister, and Anable 2012). Thus, not only infrastructural and economic aspects sustain the automobility regime, but also habits and institutions maintain the practice of driving (Schwanen, Banister, and Anable 2012). While a number of policies tend to target attitudes in order to influence travel behavior, the approach seems to downplay the importance of habits in transport practices (Schwanen, Banister, and Anable 2012).

Thus, reducing car use might require more restrictive policies than are often deemed politically viable (Owens 1995). While several policies have been implemented to reduce car use, there is also a lack of political will to reorient the automobility system radically. Geels (2012) argues that policymakers tend to follow popular opinion instead of setting an alternative agenda. There seems to be an increasing tendency for policymakers and actors in industry to acknowledge the seriousness of the climate crisis. However, for automobile manufacturers and most policy approaches, the response has been to reorient the efforts to have lower vehicle emissions and increase technological developments instead of having fewer cars on the roads (Geels 2012; Haugland 2022; Ryghaug et al. 2023). Nevertheless, similar to other low-carbon innovations (Winther and Wilhite 2015), transport technologies are prone to rebound effects (Chakravarty, Dasgupta, and Roy 2013; Langbroek, Franklin, and Susilo 2017; Vivanco, Kemp, and van der Voet 2015). In other words, as more energy-efficient transport technologies are developed, the savings in terms of costs are used for additional consumption (Chakravarty, Dasgupta, and Roy 2013). Such rebound effects are also connected to the fact that technologies perceived as more environmentally friendly, such as EVs (electric vehicle), are used more than technologies understood as higher polluting (Langbroek, Franklin, and Susilo 2017), which might offset energy savings.

2.2 Discussion of terms

Smart mobility and Mobility-as-a-Service(MaaS) are often understood to encompass platform mobility. For this reason, I present and discuss these ideas. This section will also provide a critical gaze on the term “the sharing economy” and my rationale for my choice to use “platform mobility” rather than “shared transport.” Following the justification of using platform mobility, I outline how I chose to refer to the two cases I focus on in this thesis: “dockless bicycles” and “ride-hailing.”

2.2.1 Smart mobility and Mobility-as-a-Service

I understand *smart mobility* as an umbrella term that covers a range of technological shifts in the mobility sector. Since the transport sector always has evolved to encompass new

technologies, Marsden and Reardon (2018, 2) point out that smart mobility is perhaps “more a label with currency than anything specific.” At the same time, as we have been witnessing a rapid development in a number of transport technologies in the past 10–20 years, the label does hold currency (Marsden and Reardon 2018). Smart mobility is often understood to include automated vehicles and infrastructure, the use and collection of real-time big data on transport, and the electrification of fleet vehicles (Docherty, Marsden, and Anable 2018). Also, a shift from ownership-based to user-based models of mobility, increasingly organized through digital platforms, which is often referred to as “Mobility-as-a-Service” (MaaS) is often included (Docherty, Marsden, and Anable 2018; Marsden and Reardon 2018). While there are several different understandings of MaaS, an integrated MaaS system presupposes a bundling of transport services, where a number of transport services can be accessed through, for example, a monthly payment solution (Pangbourne et al. 2020), thus offering “to-door multi-modal mobility services, brokered via digital platforms connecting users and service operators” (Pangbourne et al. 2020, 35). While understandings of MaaS do not necessitate “shared micro-mobility services”, they are often envisioned as part of a MaaS scenario (Docherty, Marsden, and Anable 2018). Shared or on-demand micro-mobility services are lightweight, low-speed devices or mini-vehicles providing short-distance travel and public transport connections (Abduljabbar, Liyanage, and Dia 2021, 1). Such services include private dockless bicycles and public shared bicycle services, but also e-scooters and dockless e-bikes (Reck and Axhausen 2021, 1). In addition to on-demand micro-mobility, ride-hailing³ is envisioned to support the MaaS and add flexibility to public transport services (Sprei 2018). It is important to note that neither MaaS nor smart mobility bring goods such as increased sustainability, public health, economic benefits, and reduced congestion. Rather, much depends on how these technologies are governed and integrated into our societies (Marsden and Reardon 2018).

2.2.2 Questioning “shared transport”

Initially, the sharing economy was used only for services that did not require monetary transactions (Alsos, Jesnes, and Sletvold Øistad 2017). Today, in the media and partly in academia, the term is often understood to encompass revenue-driven companies that rent out

³ It should also be noted that the companies discussed in this thesis are increasingly becoming integrated into transport platforms, where several transport services can be ordered and paid for via a single app. For example, the ride-hailing giant, Didi acquired the dockless bicycle-sharing company Bluegogo. The increasing concentration of services within single-app ecosystems are covered in Chapter 8.

services and products. However, there is no unified definition of the term sharing economy⁴ (Santos 2018); thus, it is often unclear which actors should be included under the umbrella (Schor 2016). Nevertheless, several contributors understand the sharing economy as a system in which underutilized assets and resources are used, often through digital platforms (Avital et al. 2014; Tirachini 2020; Wallsten 2015). Also, a number of positive benefits are often mentioned in the same context as the sharing economy, such as optimization of resource use, collaboration, matching demand and supply, and sustainability. Similar to the lack of an agreed-upon definition of the “sharing economy,” there is no consensus on the definition of “shared transport/mobility” (Rayle et al. 2016). The definitions often refer to travel based on use rather than ownership of vehicles and technology to connect users and providers (Santos 2018; Machado et al. 2018).

Regardless of its exact definition, the use of the term “the sharing economy” has met considerable criticism in public and academic debate in China and elsewhere (Cao, Prior, and Moutou 2021). Much of the criticism has centered on the point that “sharing” veils something that might be more accurately described as short-term rental or ordering services (Belk 2014; E. Huang 2017; Schor 2016; Spinney and Lin 2018). In an influential blog post, Kalamar (2013) criticized the sharing economy for “sharewashing,” arguing that the sector was masking the push for increased consumption behind the guise of “sharing,” a term that has caught on also in the academic literature (Hawlitschek et al. 2018; Lehr, Büttgen, and Bartsch 2021). There certainly exists actors that facilitate sharing of resources, such as RideAustin for ride-hailing (Tirachini 2020), Couchsurfing for accommodation, and small-scale society-based sharing of tools, plants, and communal offices (Schor 2016), as well as libraries. Still, the major actors in the “sharing economy,” including the companies covered in this thesis, certainly rent out/offer the purchase of services rather than share resources. Furthermore, instead of using underutilized resources, many companies are geared towards an oversupply of, for example, bicycles. We are today, therefore, seeing the corporatization of the “sharing economy” (Schor 2016), whereby commercial actors are using the vocabulary relating to “sharing” to refer to short-term rental (Belk 2014).

In short, a lively debate surrounds the concept of “the sharing economy.” It is worth noting that the overall view that authors have of the companies, whether they are primarily a positive

⁴ This is often the case with “hyped-up” terms that imply technological changes aimed at increasing social and economic benefits, such as “smart city” and “digital city” (Dameri and Rosenthal-Sabroux 2014b), as well as “big data” (De Mauro, Greco, and Grimaldi 2015).

or negative contribution to society, tends to reflect whether they understand the companies as a part of the sharing economy. Broadly, I would argue that at least in the case of the academic literature, contributions fall into two main categories. First, there are contributions that place these companies under the umbrella of the “sharing economy.” The authors of such contributions highlight aspects such as technological progress, circular economy, innovation, the potential of decarbonization, efficient resource use, and a shift from ownership to use (Gao and Li 2020; Machado et al. 2018; Q. Sun et al. 2019; H. Yang and Xia 2021; Yun et al. 2020). The second category comprises contributions that question or consciously omit the term the “sharing economy.” Topics treated in this category of the literature include precarious work conditions, (ir)responsible innovation, power concentration, unfair competition, safety issues, and increased congestion (Chambers 2020; Curran and Tyfield 2020; Long and van Waes 2021; Sandbukt 2021; R. Xu and Chatman 2019).

2.2.3 Why “platform mobility?”

Whereas the terms “sharing economy” and “shared transport/mobility” seem currently popular in academic and public discourses there are good reasons to use alternative concepts. Alternatives include “online collaborative consumption (OCC)” (S. Gu and Huang 2019), and “digital mobilities” (Curran and Tyfield 2020).⁵ Also the term “Transport(ation) network companies” is used in several academic publications to refer to providers of mobility services (Tirachini 2020; S. Wang and Noland 2021; R. Xu and Chatman 2019).

In this thesis, I use the term “platform,” and hence the terms “platform mobility” and “platform mobility companies.” In line with Gibbings, Frey, and Barker (2022, 634), I understand platform mobility as “movements of people and goods that are managed at least in part by a digital infrastructure, or ‘platform,’ whose consumer-facing interface is often an app.” Drawing on the report by Alsos, Jesnes, and Sletvold Øistad (2017), I would argue that it the platform is the fundamental element that defines the services.⁶ The platform, which often is in the form of a smartphone app, is the central technology that enables the transaction

⁵ In the academic literature, including the mobilities turn, “digital mobilities” is often understood as movement in digital space (e.g. Adey et al. 2021). Therefore, I do not use the term in this thesis because it might invoke other connotations. Furthermore, as the use of the term “online collaborative consumption” has some of the same issues as the use of the term “sharing economy,” it might be questionable as to what extent we are seeing a form of “collaboration.”

⁶ In a similar vein, Rayle et al. (2016, 169) choose to use the term “source” and they state: “We chose to use “ridesourcing” because we believe it succinctly conveys the essential technology—a platform used to “source” rides from a driver pool.”

of services in real time and on the scale we are witnessing today. While also the term “transport network companies” functions as a descriptively apt concept, the use of the term “platform mobility” may refer to the phenomena as a whole, thus including the sociotechnical system rather than just the companies. Drawing on the paper by Mullen and Marsden (2016), by using the term “mobility” rather than “transport,” I argue that not only the movement of people (and goods) are taken into consideration, but also a wider range of sociotechnical configurations. In the context of this thesis, this includes practices, regulations, norms, skills, companies, and digital infrastructures. Also the term “platforms” has the benefit of being relatively established. To summarize, the term “platform” rather than “sharing” provides a better understanding of the phenomena, as “sharing” veils the profit-driven model of the companies and the oversupply that, in many instances, they generate.

However, without doubt, there are problematic aspects of the term “platform” term. For example, some companies argue that they should be understood as platforms connecting people and services in order to limit the responsibility of riders and drivers. Still, as they often take very limited employer responsibility, this is at least descriptively correct.

2.2.4 Ride-hailing, dockless bicycles, and carpooling

Furthermore, several concepts are used for on-demand hailing and for booking driving services through platforms, including “ride-hailing,” “ride-sourcing,” “app-based ride services,” “ride-booking,” and “(on-)demand ride services” (Tirachini 2020; J.-W. Hu and Creutzig 2022), as well as “e-hailing” (Montero 2019, 14). In this thesis, I distinguish between “ride-hailing” and booking traditional/official taxis through platforms. I understand ride-hailing as car-based mobility made possible by online platforms that connect users to drivers using vehicles that are privately owned by the driver or obtained through leasing or other modes. By contrast, I understand the booking of taxis through platforms as car-based mobility that connect users to taxi services. As my empirical discussions in this thesis seeks to make clear, making a distinction between hailing private vehicles via platforms and hailing taxis is often of importance.

The terms “bike sharing” (F. Wu and Xue 2017), “public bike sharing 2.0” (Spinney and Lin 2018), “dockless bike-sharing” (J.-g. Shi et al. 2018), “station-free bike sharing” (Z. Gu et al. 2019), “stationless bikesharing” (Heymes 2019), and “free-floating bikesharing system (FBS)” (M. Chen et al. 2020) are used for companies providing bicycle rental services. In China, the

official stance on bicycles has been to frame them as both “shared,” “rented” and “online” (Ministry of Transport of the People’s Republic of China 2017b, 2017c; Reddick, Zheng, and Liu 2020). In this thesis, I use “dockless bicycles” to refer to such services, in line with authors such as Chambers (2020) and Bordenkircher and O’Neil (2018). In this manner, I avoid the concept of “shared,” while still aiming to make clear the services to which I am referring. While dockless bicycle schemes can be provided by public or private actors, in this thesis I refer to schemes provided by private companies, which rent dockless bicycles on a short-term basis.

Although the thesis focuses on dockless bicycles and ride-hailing, I also cover platform-based carpooling services (discussed in Chapter 9). Carpooling is accessible via several ride-hailing apps in China, including the company discussed the most in this thesis, Didi. In China, Didi offers two carpooling services: Didi Hitch and Express Pool (see Table 2 in the next section). Didi Hitch connects people who are traveling in a similar direction (Didi Global 2022), often over relatively longer distances for trips planned in advance (X. (Xiaowei) Chen et al. 2021, 1543; B. (Biyng) Yu, Li, and Zue 2020), such as between cities or to an airport. By contrast, Didi Express Pool offers on-demand ride-hailing services with the driver working for the company, often termed “ride-splitting” (Wang, Chen, and Chen 2019, 58). Thus, while the driver in ride-hailing and ride-splitting services functions much as a taxi driver, for carpooling services, such as Didi’s Hitch, the driver is intending to travel to either the same location or to a nearby location as the passenger(s) (Montero 2019, 14). Furthermore, while Didi’s algorithm decides the price of Express Pool, in the case of Hitch, the driver and the passenger(s) can share the costs of the trip (Russell 2018), which also means that drivers can offer free trips.

Traditional carpooling can be organized informally, for example between colleagues living nearby or simply through hitchhiking. Carpooling has existed much longer than the Internet, but with the introduction of platform mobility, carpooling between strangers is maintained by a reputational system provided by the apps (Belk 2014). When discussing carpooling in this thesis, I refer to the form that is enabled by platforms.

2.3 Companies, services, business models, and technology

Having thus far introduced debates concerning the term “the sharing economy” and “shared transport,” and having explained why instead I use the term “platform mobility,” I now provide a more descriptive account of the business model and key technologies of the two main cases of this thesis: ride-hailing and dockless bicycles. However, I first briefly discuss the existing literature on platform mobility.

There is a rapidly growing body of literature on platform mobility in China,⁷ and some of the publications directly discuss business models (P. Lin et al. 2020; O. Wang 2019; Y. Yang 2019). Several articles on spatiotemporal characteristics and usage frequency in China offer advice for operators and policymakers on issues such as improved allocation of services (e.g., rebalancing in the case of bicycles), connectivity with public transport, and avoiding oversupply (Cao, Prior, and Moutou 2021; A. (Aoyong) Li et al. 2020; Y. (Yuan) Li, Zhu, and Guo 2019; S. Wang and Noland 2021). In addition, a large number of contributions from technical disciplines, without a specific geographical focus, cover issues such as the optimization of ride-hailing and algorithms or dockless bicycles (Cao, Wang, and Li 2021; Chaudhari, Byers, and Terzi 2018; Fan, Ma, and Li 2020; Pan et al. 2019; Qin et al. 2021; Takano, Chida, and Horita 2022;) electric dockless bicycles (Corno, Duz, and Savaresi 2021), electric fence planning for dockless bicycles (Y. Zhang, Lin, and Mi 2019), and locking technology (F. Chen et al. 2018). There are also contributions from SSH rooted in a Chinese context that critically scrutinizes the role of algorithms, particularly in terms of working conditions (J. Y. Chen 2018; J. Y. Chen and Qiu 2019; A. K. (Angela Ke) Li 2021). Due to the existence of this rich literature, this section serves only as a brief introduction to business models and technologies. I start with the launch of the companies in China.

Didi Dache and Kuaidi Dache launched in China in 2012 (J. Y. Chen and Qiu 2019). Although other companies rapidly appeared, these two were, by 2013, the two largest ride-hailing companies in China (Chan and Kwok 2021). They were initially launched as taxi booking platforms to book state-licensed taxis. The companies worked hard not only to enroll

⁷ There are also literature reviews of platform mobility focusing solely on China (Cao, Prior, and Moutou 2021; J.-W. Hu and Creutzig 2022), and some on platform mobility in various geographical locations, including China (Abduljabbar, Liyanage, and Dia 2021; Boar, Bastida, and Marimon 2020; H. Si et al. 2019; Teixeira, Silva, and Moura e Sá 2021; Tham 2016).

users but also to enroll drivers. X. Guo and Gallo (2017, 182) state: “They both sent hundreds, if not thousands, of field agents to install its application on taxis and other service providers.” Over time, as users had grown accustomed to booking taxis through the platform, drivers with private cars were also able register, from 2014 onwards (Zhong and Yuan 2021). Over time, Didi has expanded its business and offers a range of services for different market segments, including Express, Premier, and Hitch (T. Wu 2019). An overview of the companies mentioned in this thesis is provided in Table 2.

Table 2. Platform mobility companies discussed in the thesis (sources: X. (Xiaowei) Chen et al. 2021; Didi Global 2018, 2021, 2022; Z. Wang, Chen, and Chen 2019; T. Wu 2019; B. (Biying) Yu, Li, and Zue 2020)

Company	Services	Short explanation
Didi Chuxing	Express (<i>kuaiche</i>)	Ride-hailing, private vehicles
	Premium (<i>licheng zhuanche</i>)	Ride-hailing, private vehicles
	Luxe (<i>haohua che</i>)	Ride-hailing, standardized sedans
	Express Pool (<i>pinche yewu</i>)	Combination of ride-hailing and carpooling. Use of private vehicles. Several passengers going in similar directions.
	Hitch (<i>Shunfengche</i>)	Connects people going in a similar direction, driving not working for the company
	Taxi (<i>chuzuche</i>)	Hailing official taxis through the Didi-app
	Didi bus (<i>bashi</i>)	On-demand shuttle bus service
<i>Shouqi Yueche</i>	Premium ride-hailing	Standardized sedans
<i>GoFun</i>	Car rental	Short-term rental of cars unlocked through an app (without drivers)
<i>ofo</i>	Dockless bicycles	
Mobike/Meituan bike* (<i>Mobai</i>)	Dockless bicycles and pedelegs**	
Hellobike (<i>Haluo danche</i>)	Dockless bicycles and pedelegs	
Bluegogo (<i>Xiao lan dance</i>)	Dockless bicycles	
Didi dockless bycles (<i>Qingju</i>)	Dockless bicycles and pedelegs	
Anonymized company	Dockless Pedelegs	

*merged in 2019

** In contrast to, for example, electric scooters, pedelegs have pedals, and pedaling is assisted by a small electrical motor.

In terms of financing, ride-hailing companies earn money from commissions and service fees, while dockless bicycle companies earn money from rental charges. In addition, in the case of the dockless bicycle companies, deposits represent an important part of their cash flow (X.

Wu 2017). While it has been unclear how these funds are used, the companies have struggled to refund deposits, which indicates that deposits have been an important part of their economy. Most platform mobility companies rely heavily on venture capital, often obtained from other companies in the technology sector. Technology giants such as Alibaba and Tencent have been “betting on different horses” in the transport sector. Investments in platform mobility companies should not be understood independently of online payment solutions, as Alibaba and Tencent respectively provide Alipay and Wepay, which are used to pay for the services.

However, the platform mobility companies have also been losing large amounts of money (Lia 2019), and bankruptcies and mergers have been rampant. As with many actors in the platform economy, ride-hailing and dockless bicycle companies have been spending incredible amounts of money from investors on promotional campaigns and price subsidies (Y. Sun 2018). Expenditures on bicycle production, loss of bicycles, maintenance, coupons, and subsidizing drivers have not kept up with the prices they set in order to compete for customers. The companies’ goal has been to gain a monopoly,⁸ or close to it, to enable them to set financially viable prices in the long term (X. Zhao 2018; R. Ma n.d.). However, although Didi had a market share of about 90% in the period 2018–2022 (H. (Han) Jiang 2022), it continued to lose billions of US dollars yearly (van Wyk 2022).

The central technology of dockless bicycles is the locking technology in the wheel, which enables the bicycles to be free-floating rather than attached to docking stations (Figure 2). The locking system is enabled based on Bluetooth, GPS, and an electromechanical locking device. Through scanning the QR code, the user sends an unlocking request to the server (Jinjian 2022). Several companies, including Mobike, install solar panels in the basket on the bicycle to provide power to the locking technology.

⁸ In some instances, the competition lasted too long for the investors. For example, in 2015, the investors of both Didi and Kuaidi Dache came together and finalized a merger between the companies and created Didi Chuxing (X. Guo and Gallo 2017).



Figure 2. Locking device on a Mobike bicycle, Shanghai, December 2018.

Human-powered bicycles dominate the dockless bicycle market. However, there are also dockless e-bikes; electric scooters, and pedelecs. While this thesis focuses mainly on human-powered bicycles, it also covers a smaller, anonymized company that provides pedelecs. The use of pedelecs is unevenly integrated across China. While there were few in Beijing in 2019, they could be easily found in the neighboring city of Tianjin.

While users of dockless bicycle systems find and choose the bicycles themselves, either through the app or on the streets, ride-hailing services are allocated to the users (Figure 3). Pricing and matching algorithms are central technologies of ride-hailing companies (Yan et al. 2020). The matching algorithm is aimed at reducing waiting time for both users and drivers and produces an estimated waiting time for the users (Y. Liu et al. 2022). The dynamic pricing algorithm sets the price according to supply and demand, often reflecting rush hours, rainy days, and so forth (Y. Liu et al. 2022), in addition to areas, distance, time, road congestion, and other factors (L. Si 2021). However, the pricing algorithms are notoriously opaque, and some research indicates that pricing is also based on estimations of individuals' ability to pay (e.g., J. Wu 2021).

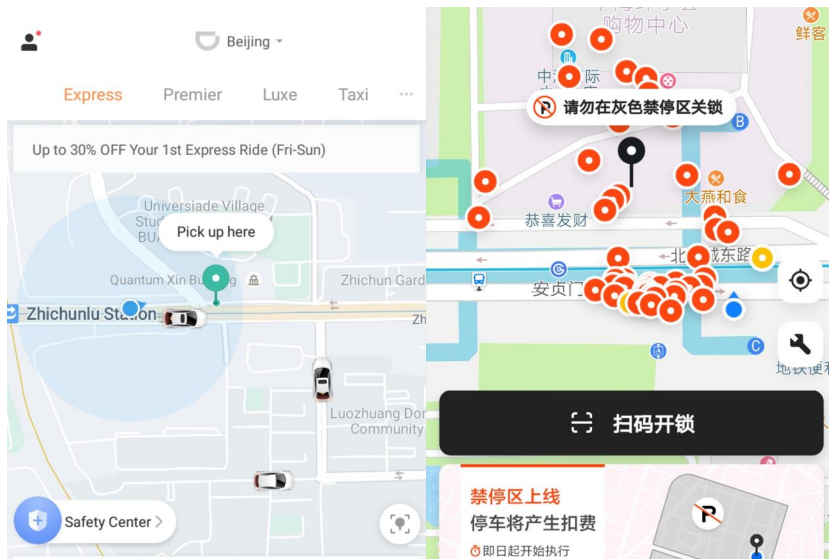


Figure 3. App interfaces. Left: Screenshot from Didi (English version); the app indicates the number of Express vehicles nearby in Beijing, August 2019. Right: Screenshot from Mobike in Beijing, August 2019); each of the dots in the images represent a bicycle.

In the following section, I discuss literature that includes aspects relating to sustainability and just mobility.

2.4 Platform mobility: towards a more sustainable and just transport system?

The following section will start by outlining some mobility justice implications of platform mobility across geographies (2.4.1). Thereafter, I turn the attention to issues with platform mobility's sustainability in general (2.4.2) before covering literature that investigates the sustainability of dockless bicycles and ride-hailing in the Chinese context (2.4.3).

2.4.1 Implications for mobility justice in China and beyond

The highly privatized platform mobility market is not geared towards being available for all (J. (Jun) Zhang 2022). Therefore, there is a risk that platform mobility might increase

preexisting differences in the provision of mobility services and contribute to gentrification processes (Bradshaw 2021; Brancard 2018; Schwanen 2016). The following (in Section 2.4.2) will first cover contributions from across geographies before concentrating on the Chinese context.

Platform mobility does not only have justice implications for its users but also for their workforce. Much of the sector is built on a precarious workforce, with workers doing what is sometimes referred to as “gig work.” The platform economy jargon is aimed at portraying the relationship between drivers and passengers as one of equal exchange (e.g., “peer-to-peer”) (Sandbukt 2021) and creating economic opportunities (Roose 2014). However, critics argue that the companies rather exploit desperation among economically vulnerable populations (Roose 2014; Sandbukt 2021). Muntaner (2018) argues that the rhetoric of the sharing economy and flexibility shrouds the inherent class conflict of the industry with regard to aspects such as job insecurity, job demands, low wages, lack of benefits, and the difficulty of unionizing. Workers are also subject to a significant degree of algorithmic control (Edward 2021), and the platforms include new types of stress for the workers due to real-time monitoring (J. Y. Chen and Qiu 2019; Muntaner 2018).

A growing body of literature has shed light on the inclusionary and exclusionary potential of platform mobility. For example, structural, financial, and cultural barriers to the adaption of dockless bicycles have been identified (Bradshaw 2021). Furthermore, due to the for-profit nature of such schemes, the accessibility of platform mobility is often concentrated in central areas and/or areas with populations with relatively high purchasing power (J. Clark and Curl 2016). Based on such empirical findings, questions have been raised as to what extent such schemes increase mobility for populations at risk of transport-related social exclusion (J. Clark and Curl 2016).

Gentrification processes and reproduction of mobility divides and can happen in manifold ways across geographies. In the Chinese context, research indicates that younger segments of the population are more likely to use privately operated dockless bicycles than municipality-operated public bicycles (W. Li et al. 2019; F. Zheng et al. 2019). Hence the defunding of traditional public bicycle-sharing systems might affect different age groups disproportionately (W. Li et al. 2019). With regard to ride-hailing, B. (Biying) Yu, Li, and Zue (2020, 231) found that people with higher incomes were more likely to use ride-hailing than other population groups. Furthermore, dockless bicycles have contributed to the

marginalization of illegal motorcycle taxi drivers (J. (Jun) Zhang 2022), which is the last resort for making an income for parts of the migrant population (Zuev 2018). For non-users, dockless might hamper mobility. In many cities in China, the ability to walk has been reduced due to the number of bicycles on sidewalks. Sometimes walking is highly obstructed around important public transport nodes, shopping areas, and universities. Dispersed bicycles have particularly been a problem, such as for people who use a wheelchair or have impaired vision (R. Chen 2019). Additionally, platform mobility services are spatially unevenly distributed. For example, dockless bicycles are concentrated in central areas, which often are well-served by public transport (J. (Jun) Zhang 2022).

In short, platform mobility has a number of mobility justice implications, many of which have not been explored thoroughly in the English academic literature relating to China, with a few exceptions: J. Y. Chen (2018), Spinney and Lin (2018) and J. (Jun) Zhang (2022). This thesis contributes in this regard by shedding light on gendered aspects, constructions of otherness, and access (Chapters 8 and 9).

2.4.2 Overarching discussion of sustainability and platforms

There is a wide range of issues connected to platform mobility and sustainability. Business models, local and national regulations, user practices, energy systems, local climate and weather conditions, production processes, vehicle standards, integration into other technical systems, and many more aspects impact how platform mobility can contribute to sustainability. In short, platform mobility is hardly just one thing for which we can measure the environmental effects. At the same time, some challenges to sustainability can be identified across geographies. The following discussion, therefore, starts with some challenges that are applicable across countries before focusing on the Chinese case in the next sub-section.

First, a central aspect of a profit-driven model is that the companies may seek to create new forms of mobility demand to maximize their returns (Pangbourne et al. 2020). With increased demand, there is always the potential to offset the potential reduction in pollution to which the model's application may contribute (Docherty, Marsden, and Anable 2018). Thus, for platform mobility to be sustainable, it needs to go beyond a modal shift and include decreased mobility demand (Ruhrt 2020). *Second*, a less-discussed element related to sustainability is its connection with consumption in general. Like many other actors in the platform economy,

the actors earn money from advertisements (albeit to a varying extent), which may contribute to increased consumption. *Third*, a topic that has gained attention only in recent years is the energy use of data storage facilities. While digitalization and sustainability often have been understood to go hand in hand, the resource use for storing data and operating devices has contributed to questions being raised about this link⁹. *Fourth*, platform mobility, together with other forms of smart mobility, has experienced a massive explosion in attention, and this thesis is no exception in this regard. The question is, what other solutions might platform mobility be “stealing the spotlight” from? Being highly visible and driven by new combinations of technology, platform mobility often receives far more attention, perhaps at the expense of more mundane “old technologies,” such as the conventional bicycle and public transport.

2.4.3 Sustainability in the Chinese context

There has been scarce research on mobility justice and platform mobility in the context of the Chinese context, but much more has been researched and written about sustainability.

Some of the key questions regarding ride-hailing and sustainability are the impact on car use, vehicle production, and mileage. At the same time, there is no consensus in the academic literature on the issue. Findings diverge on the extent to which ride-hailing companies contribute to decreased emissions, congestion (Diao, Kong, and Zhao 2021; Nie 2017; Y. (Yanwei) Li and Ma 2019), and car purchases (B. (Biying) Yu, Li, and Zue 2020; Y. Guo et al. 2020; Yun et al. 2020). Further, energy saving is dependent on a range of factors, including how many people share a car and whether carpooling or ride-hailing services are used (B. (Biying) Yu, Li, and Zue 2020).

Furthermore, survey-based research from China has shown that ride-hailing contributes to generating car trips that otherwise would have been made by walking, cycling, or public transport (K. Shi et al. 2021; B. Tang et al. 2020; B. (Biying) Yu, Li, and Zue 2020). On a related note, there are concerns related to the oversupply of ride-hailing services (S. Wang and Noland 2021). In many Chinese cities, authorities have worried that ride-hailing has

⁹ As pointed out in an online article in *Nature*, “Data centers contribute around 0.3% to overall carbon emissions, whereas the information and communications technology (ICT) ecosystem as a whole—under a sweeping definition that encompasses personal digital devices, mobile-phone networks and televisions—accounts for more than 2% of global emissions. That puts ICT’s carbon footprint on a par with the aviation industry’s emissions from fuel” (Jones 2018).

contributed to less use of public transport and led to increased traffic congestion and they have therefore implemented stricter regulations (Y. (Yanwei) Li and Ma 2019).

The dockless bicycle companies not only present themselves as sustainable (Mobike 2017), but they have also been recognized externally. For example, Mobike was awarded the Entrepreneurial Vision category of the UN's Champion of the Earth award in 2017, for its contributions to promoting green travel (36Kr 2017). However, the prize was not uncontroversial, and the sustainability of dockless bicycles more generally has been called into question. While public bicycle-sharing has been found to have a positive effect on the decarbonization of transport in many locations (A. (Aoyong) Li et al. 2020), the same can not be automatically assumed for dockless bicycles (Spinney and Lin 2018). Rather, dockless bicycles have been found to have a higher environmental footprint than stationed-based bicycles (Luo et al. 2019).

It is difficult to find independent research supporting the claim that dockless bicycles have reduced motorized transport means. While L.-Y. Qiu and He (2018) claim that dockless bicycle schemes can reduce energy use and emissions, their calculations are based on political goals for reduction in car use in Beijing, rather than on actual changes in travel patterns. Y. Zhang and Mi (2018) study also claim that they found considerable environmental savings from use of dockless bicycle use in Shanghai, based on big data obtained from Mobike. While Y. Zhang and Mi (2018) use spatiotemporal data on dockless bicycles use, their study did not include data on which travel modes dockless bicycles replaced. Instead, they base their findings on dockless bicycles replacing walking and taking taxis.¹⁰ Research based on surveys has found that dockless bicycles predominantly replace walking and public transport, and, to less extent, motorbikes, taxi, and private cars (H. (Hui) Jiang et al. 2020; Y. Sun 2018; F. Zheng et al. 2019). From a qualitative perspective, J. (Jun) Zhang (2022, 724) notes that although some of her middle-class study participants used dockless bicycles, “no middle-class car owners have changed their car-centric lifestyles.” Furthermore, the study conducted by L.-Y. Qiu and He (2018) and Y. Zhang and Mi (2018) only considered change in travel mode based on estimates and did not include life-cycle assessments (production and waste management) and emissions associated with rebalancing.

Some of the shortcomings of previous studies are addressed by F. Zheng et al. (2019), who conducted a survey of changes in travel mode among dockless-bicycle users and a life-cycle

¹⁰ In the US context, Luo et al. (2019, 187) found that in order to reduce green house gas emissions, 34% of dockless bike trips needed to replace car use.

analysis of the bicycles. By including the production, maintenance, and discarding of bicycles, F. Zheng et al. also considered environmental pollution beyond CO₂. Following an analysis of eleven indicators, they found that, with one exception (metal depletion potential), “the environmental savings of using shared bicycles are sufficient to offset the environmental impacts of shared bicycles arising from their entire life cycle” (F. Zheng et al. 2019, 11). Therefore, they conclude that using dockless bicycles is an environmentally friendly practice (F. Zheng et al. 2019). The study conducted by Mao et al. (2021) took a similar life-cycle approach but did not consider changes in transport modes. Thus, the main contribution of their article is a better understanding of which part of the life cycle represents the greatest amount of emissions. Compared to other transport technologies, the production of dockless bicycles represents a very large share of the life cycle emissions, over 80%. The high percentage is probably due to the bicycles’ short life span and low maintenance rate. Therefore, optimizing the production process in terms of environmentally friendly materials and the material amount is of key importance to the overall sustainability of the sector. Furthermore, as the bicycles are usually scrapped after the least durable part breaks down, due to the price of maintenance, designing bicycles that can more easily be repaired is central to sustainability (Mao et al. 2021).

In addition to aspects related to changes in travel patterns, the oversupply of bicycles has been identified as a challenge to sustainability (J.-g. Shi et al. 2018). Particularly during the heydays of dockless bicycles, unusable bicycles could regularly be seen in rivers, ditches, and at the side of highways (Figure 4). Enormous amounts of steel and aluminum (F. Zheng et al. 2019) have been required to produce both the bicycles on Chinese streets today and the already discarded ones (Stevenson and Li 2019). After a short life span of a maximum of three years, as mandated by regulatory bodies (Mao et al. 2021), the bicycles also generate large amounts of e-waste from chips and PVs (photovoltaics) when dumped. Waste recycling and reuse are more or less absent (J.-g. Shi et al. 2018, 13), and no standardized system for recycling has been established (Mao et al. 2021, 6). Certainly, the short life span of bicycles has gained considerable attention. The enormous amount of unused and broken bicycles piled up in so-called “bicycle graveyards” has led to impactful photos in the press, leaving the companies with a problematic image in terms of sustainability (e.g., B. Haas 2017).

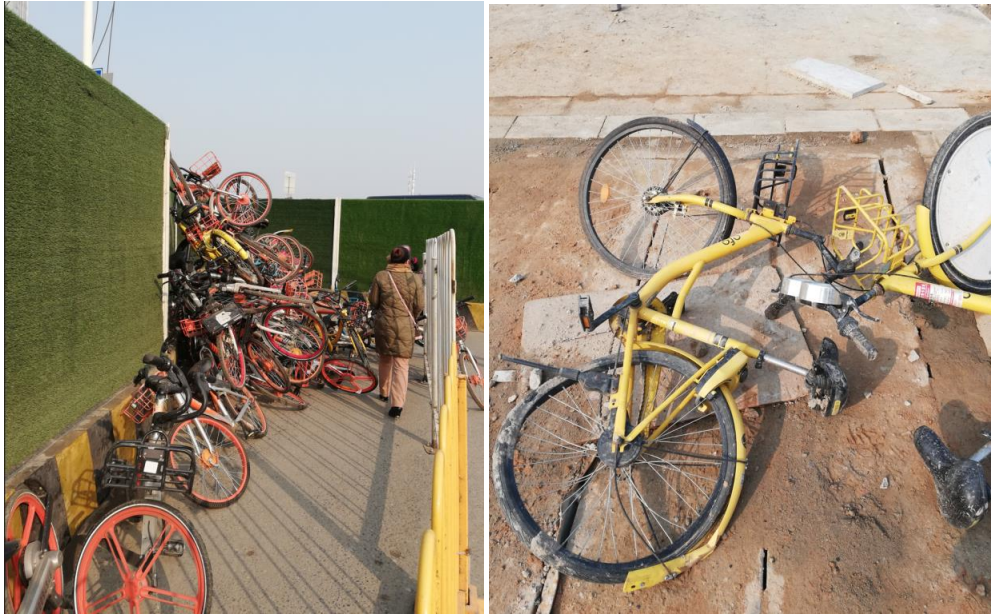


Figure 4. Dockless bicycle heaped outside a construction site in Wuhan December 2018

While cycling is often regarded as a token of green transport, dockless bicycles should not automatically be equated with sustainability. The sustainability of platform mobility has been one of the issues that has sparked debates on governing the sector. However, sustainability is but one aspect. In the following section (2.5), I discuss the need for and difficulty of governing platform mobility.

2.5 Governing platform mobility

Docherty, Marsden, and Anable (2018, 119) argue that “there are fundamental decisions to be made about what exactly is the public good that Mobility-as-a-Service will provide, and therefore the role of the state in governing it.” Technology and innovations related to “smart mobility,” which, according to their understanding, includes platform mobility, are often created alongside rather than within existing mobility systems and rule sets, which is a key source of tension (Docherty, Marsden, and Anable 2018). Therefore, there has been a call to

govern the sector to avoid the transport system's previous unsustainable pitfalls (Mukhtar-Landgren and Paulsson 2021).

The difficulty of regulating platform mobility for governments worldwide has become apparent, as many countries have been uncertain about what platform mobility companies are, what regulations should apply to them, and whether they require new regulations or should come under existing ones. A number of questions arise when regulating the sector. What responsibility do they have vis-à-vis their passengers and their employees, and who are their employees? (J. Y. Chen 2018; Montero 2019) What responsibility do they have for public space and society? (Ruhrt 2020). How should concerns be balanced between platform mobility and traditional players (Montero 2019)? How should they be taxed (F. Chen et al. 2018; Cheng et al. 2021; Dai 2019; H. (Huiqin) Jiang and Wang 2020)? To what extent should their power be curtailed, and should the state intervene to avoid monopolizing tendencies in the market? (Montero 2019)? In addition, aspects related to data governance (Mukhtar-Landgren and Paulsson 2021; Schellong et al. 2019) and equitable access come into question (Ruhrt 2020). In short, for states, the acquisition of knowledge about the companies and making them "governable objects" is challenging (Mukhtar-Landgren and Paulsson 2021).

Controversy seems to follow platform mobility companies wherever they operate, and legal and regulatory responses vary between countries and cities. For example, in many American cities, the Uber platform was first met with court orders, charges, or outright bans. Over time, either it became integrated into existing regulations or new regulations were created, which allowed for its full legalization (Spicer, Eidelman, and Zwick 2019). In Vienna, several dockless bicycle companies withdrew from the city in 2018 after a cap of 1500 bicycles per company was introduced (Laa and Emberger 2020). In San Francisco, ahead of Bluegogo's launch, local authorities passed regulations, in effect making it impossible for the company to operate there (Horwitz 2017a). Thus, in some cities, regulations have outright banned companies' operations or have become strict to the extent that operators have chosen to withdraw.

In short, platform mobility poses considerable regulatory challenges and has sparked debates across countries. However, in China, the pressures are increasingly present due to the size of the platform mobility sector. Given the considerable social challenges that platform mobility brings and bans in other countries, it may be apt to ask why Chinese authorities have not

simply banned the sector altogether. Therefore, in the next section, I explore how platform mobility fits into larger state-led projects and the ambitions of contemporary China.

2.5.1 Legalization despite controversy

In the first part of this section, I will argue that the sector has, to some extent, been embraced by the Chinese state. However, the main part of this section is dedicated to a discussion of how I understand platform mobility to align with overall societal goals in China.

Y. (Yanwei) Li and Ma (2019) argue that the overall attitude from the central government is positive towards the “sharing economy,” including ride-hailing. This general welcoming approach or stamp of approval can be identified from, for example, investments. China Investment Corp., the country’s sovereign-wealth fund, has invested in Didi (at that time, Didi Kuaidi), despite investment seldom being made in Chinese technology companies, and this is often understood as implying a stamp of approval from the government (Carew 2015; Horwitz 2016).

Platform mobility’s role as a part of the national narrative on technology progress is also manifested in state media and other channels. In 2017, a national committee announced that the word of the year was *xiang*, meaning to share. The committee mentioned the sharing economy and dockless specifically in its announcement (Z. Huang 2017b). Additionally, dockless bicycles, e-commerce, mobile payment, and high-speed trains have often been cited as “the four new inventions“ of China (Xinhua 2017). Although the “Chineseness” of these inventions has been questioned (Jakhar 2018), the dockless bicycle is now very strongly associated with Chinese innovation.

Further, 2019 marked an important change for the platform mobility sector following the publication of the document “Outline for Building China’s Strength in Transport” (Ibold and Li 2019). Under the section headed “Accelerating the development of new business models,” one of the goals is stated as “Developing shared transport, building service system based on smart mobile terminal technology and realizing Mobility-as-a-Service (MaaS)” (Ibold and Li 2019). Thus, it appears that, at least for a period of time,¹¹ the companies were given an official stamp of approval from the national level and officially given a role in the future of the urban transport systems.

¹¹ However, since 2021, the picture has looked quite different, the “crackdown” on the technology sector in China is discussed in the epilogue in Chapter 6, Section 6.5.

Understanding the overall positive attitude despite the surrounding controversies and questionable sustainability of the sector serves as an important background for this thesis. The following discussion also contributes to an understanding of how platform mobility fits into the larger, contemporary projects of the Chinese state. The discussion covers (1) flexibility of the transport system, (2) technology-related ambitions and an increasingly innovation-driven economy, (3) international image, and (4) employment and social stability.

First, the companies may contribute flexibility to the mobility system. The dockless bicycle companies add services that the authorities might not have prioritized otherwise. For example, Beijing has long been lacking a well-functioning public bicycle scheme. While Beijing has a highly developed metro system, totaling 27 lines as of June 2023, many residents live and work over 1 kilometer from the closest metro station. Therefore, dockless bicycles have become a welcomed contribution to solving the problem of the “last mile” (i.e., the distance between public transport stations and the start or end of a journey). Furthermore, in 2013 the Chinese Ministry of Transport referred to ride-hailing services as complementing the taxi industry, and thereby recognized the need for increased flexibility in urban mobility (Noesselt 2020). In short, platform mobility companies seek, partly with success, to position themselves as complementary to public transport rather than as competitors.

Second, platform mobility can also be understood as aligning with the overall focus at the national level in a technology-driven society, as well as with the focus on smart cities and automation. In terms of technology upgrading in transport, China’s Five-Year Plans,¹² and more topic-specific plans such as the Clean Air Action Plan, Internet Plus action plan,¹³ Guidelines for Promoting Healthy Smart City Development, Three-Year Action Plan for Promoting Development of a New Generation Artificial Intelligence Industry (2018–2020), and Big Data Strategy, identify targets for technological development. Ideas for promoting urban digitalization were included as early as in the 12th Five-Year Plan (2011–2015) (Noesselt 2020). By the time of the 13th Five-Year Plan (2016–2020), “smartification” was expressed in the above-mentioned documents. In addition to such plans, ambitions to develop smart cities, AI (artificial intelligence), and autonomous-based transport have been expressed in speeches from the top levels of the CCP including Prime Minister Li Keqiang and President Xi Jinping (Noesselt 2020).

¹² The Five-Year Plans should be understood as aspirations rather than mandatory goals set by the state for the country. The plans also serve to align goals between public and private actors (Weber and Qi 2022).

¹³ In the ride-hailing sector, regulations have been explicitly tied to the realization of the Internet Plus action plan (Xinhua 2016b)

The high-tech ambitions should be understood in the context of economic development. The idea of creating a knowledge economy is expressed in, for example, the action plan “Made in China 2025” (S. Liu 2016; Wei, Xie, and Zhang 2017) and in the 13th Five-Year Plan. Like most other countries, China is seeing technology and knowledge-driven companies as the future of the economy. Contributors such as Y. (Yanwei) Li and Ma (2019) have argued that the economic potential of platform mobility is an important driving force for the overall supportive regulatory environment.

The overall national ambitions expressed in the Five-Year Plans are also tied to the individual level. In recent years, the role of Chinese citizens in contributing to innovation and starting businesses has become more articulated. This approach might be understood as a part of “socialism with Chinese characteristics” (K. M. Lim 2014; Peters 2017), in which the plan-based system is still central to guiding the country’s development, but the private sector plays a key role. Thus, in a very general sense, private initiatives that require either little or no state support are welcomed. In other words, the economic activity and technology platform mobility can be seen as a part of vague goals of individual companies’ role in the overall development of China. Moreover, Spinney and Lin (2018, 73) argue that by allowing dockless bicycles, the local government in Shanghai might avoid being regarded as a case of “stifling innovation and entrepreneurialism.”

Third, fostering technological upgrading of various kinds is important in how China presents itself internationally (Korsnes 2016). A large innovative “Chinese Silicon Valley” is not only central for attracting international capital and creating job opportunities for highly educated urbanites, but also a part of building the contemporary Chinese narrative, in which economic prosperity, technological progress, and national pride are closely intertwined. Horwitz (2016) argues that internationally, it is important for China to establish itself as an innovative and technology-friendly economy. By allowing ride-hailing companies, China can claim to be one of the most progressive countries in terms of fostering the online economy (Horwitz 2016). For China, as for many other countries, global leadership in AI development is closely associated with symbolic power and international status (Noesselt 2020). Platform mobility companies have become active players in the development of such technologies (Noesselt 2020).

Fourth, another aspect of understanding the role of platform mobility and the larger political projects is the role of employment. As Chinese economic growth has reached a more

moderate level, one of the central priorities for the authorities is to keep unemployment levels down, not only for the economy but also for reasons related to social stability (O. Wang 2019). The provision of low-skilled employment opportunities has been a challenge, particularly due to changes in the manufacturing sector (Horwitz 2016). The ride-hailing sector can thus provide low-skilled job opportunities for laid-off workers from traditional industries. Furthermore, Horwitz (2016) notes that Didi claims that over one million workers across 30 cities have registered with its company following job cuts in the manufacturing sector. Another estimate indicates that over 33 million workers have been absorbed by the so-called “gig economy” (O. Wang 2019).

Thus, platform mobility has a somewhat contradictory role vis-à-vis the state. On the one hand, the companies have been given a stamp of approval and could be argued to cohere with larger state-led projects and ambitions. On the other hand, they represent obstruction and prove difficult to turn into governable subjects. In the next section (2.6) I discuss governance, and I end the chapter by describing some tools for understanding China’s political system. Although the topic of the discussion could deserve more thorough treatment, I have chosen to focus on some key relevant perspectives in this thesis. In this respect, perspectives on state-market relations are especially applicable.

2.6 Perspectives on Chinese policymaking and state-market relations

China is organized as a Party-state, meaning that the state at municipal, provincial, and central levels are intertwined with the Communist Party of China (CPC) (Hansen and Thøgersen 2008). As an authoritarian unitary state (Aamodt and Stensdal 2017), the constitutional and governmental order does not include a division between executive, legislative, and judiciary functions (Heilmann, Shih, and Heep 2017). The *Politburo* and the *Politburo Standing Committee* are the highest decision-making and leadership bodies, and all members must be approved by the CPC (Heilmann, Shih, and Heep 2017). Furthermore, CPC holds considerable discursive power, and guiding thoughts are reflected in education and the media (Hansen and Thøgersen 2008). While formally a communist country, there have been considerable changes in political orientation since the establishment of the People’s Republic

of China (PRC) in 1949, and members of the CPC often hold diverging ideas about how the country should be governed (Hansen and Thøgersen 2008). However, there has been increasingly tighter control within the party and the country as such since Xi Jinping became president (Blanchette and Medeiros 2022; Brady 2017). Therefore, it is the one-party system, with roots in the former model of the Soviet Union (Heilmann, Shih, and Heep 2017), that has been the constant denominator rather than a given ideology (Hansen and Thøgersen 2008).

Understanding the workings of China's political system is a difficult endeavor, as it is a complex, closed-off system that seems to defy conventional dichotomies such as market-planned economy (Huotari, Stepan, and Heilmann 2017). In this thesis, I do not aim to provide a comprehensive understanding of the Chinese political system or to analyze to what extent regulatory approaches to platform mobility conform to observations from other parts of the political system. However, given the centrality of the government in Chinese everyday life and the attention to governance in this thesis, I briefly discuss some aspects of governance. In doing so, I highlight perspectives that nuance the idea of a strictly top-down model. This nuance is particularly relevant, as this thesis mainly discusses policy approaches formulated at the municipal level. Moreover, as governing platform mobility ties into the bigger picture of state-market relations in China, this too is covered in the following discussion. Additionally, when I discuss laws, regulations, and policies, especially in Chapter 6, it is important to keep in mind their entanglement. For example, laws are often reflections of the ruling party's politics (Z. (Zhizheng) Wang 2012)

Importantly, the Chinese state should not be understood as a coherent monolith with a consistent set of policy interests (Heilmann 2017; Weber and Qi 2022). In other words, despite being a one-party system, the Chinese state is hardly *one* thing. While overall policy directions are expressed through plans, roadmaps, and speeches that flow in a top-down manner, the picture is considerably more complex. Fewsmith and Nathan (2019, 170) state:

When the leadership makes a decision, whether promoting the economy or curtailing pollution, that decision is translated into tasks, and those tasks cascade downward, level-by-level, with different cadres assigned some portion of the broader task.

At the same time, local interests and initiatives, including the interests of individual cadres, are at times at odds with national ambitions (Heilmann 2011).

One of the most influential perspectives on understanding the Chinese political system from the Reform Period (1978-1994) until today is the fragmented authoritarianism model

developed by Lieberthal and Oksenberg (1988). According to this understanding, several changes in the Chinese state structure have reduced the degree to which government organs have had to respond in a disciplinary manner to the central level. While considerable political control has remained at the top level, the model emphasizes the role of bargaining, consensus building, and policy communities across bureaucratic lines (Lieberthal 1992, 8–9). In this manner, overarching political goals become malleable and adapted at the local level (Mertha 2009), rather than simply flowing directly from the top downward.

Another key feature of the Chinese political system is policy experimentation. While the fragmented authoritarian model is a theoretical concept developed by researchers, policy experimentation is a policy approach that can be found in CCP vocabulary (Heilmann 2017). This stepwise methodological approach has been central in reforming the political system and continues to play an important role in contemporary policymaking. Policy experimentation can be divided into three steps: locations are chosen, successful model experiments are identified, and only after rigorous testing and evaluation can implementation occur in national legislation (Heilmann 2017). The process is both centralized and decentralized in that the initiative and implementation are often done locally, while it is often centrally decided whether the project is deemed a success and should be implemented on a broader scale (Heilmann 2017). While the “special economic zones” might constitute the internationally most well-known example of policy experimentation, a wide range of policy areas is subject to the same approach, including the innovation system (Heilmann 2017; Wübbecke 2017). Notably, for platform mobility and other related sectors associated with smart city development, local initiatives play a key role in developing technology and policy framework (Noesselt 2020).

Drawing on the idea of policy experimentation, Breznitz and Murphree (2011) argue that the Chinese political-economic system is characterized by “structured uncertainty,” meaning that there is “an agreement to disagree about the goals on methods of policy, which leads to intrinsic unpredictability and to inherent ambiguity in implementation” (Breznitz and Murphree 2011, 38). In turn, this produces a tolerance of several interpretations and implementations of the same policy, resulting in a situation where companies have little predictability in how and when policies will be enforced and implemented, and which part of the state apparatus will have the final say (L. Tang, Murphree, and Breznitz 2016).

Structured uncertainty can also be found in the technology sector (Breznitz and Murphree 2011). Therefore, Breznitz and Murphree (2011) argue that the success achieved in the Chinese technology sector is a result of a trial-and-error approach, or economic policy experimentation. The central government has pragmatically allowed some regions quite some room for maneuver to experiment with economic structures and incentives. Some regions have been given more autonomy, including Beijing, Shanghai, and the Pearl River Delta. An important aspect is the element of competition between regions in terms of economic goals and innovation (Breznitz and Murphree 2011).

Weber and Qi's understanding of China as a "state-constituted market economy" implies that the uncertainty that marketization brings requires more rather than less state capacity to steer markets (Weber and Qi 2022). The platform economy can be understood as an intensification of markets, thus implying a need for market steering. The balancing act between market forces and steering should not be understood as a static phenomenon but as one that requires constant balancing (Weber and Qi 2022). Accordingly, the regulations of the platform sector should hardly be understood to emerge from a one-way process from the state.

Maintaining good relations with regulators is important for companies operating in China, also beyond the platform economy. While this certainly is not unique to China, the government takes a leading role in steering the economy (Fewsmith and Nathan 2019; Weber and Qi 2022), which makes maintaining good relations of particular importance. For companies across different sectors, such relations are instrumental in accessing information and preparing for regulatory changes (Y. R.-R. Chen 2007). While these reasons apply beyond the platform mobility sector, particular traits of that sector may make government relations of particular importance. For example, how platform mobility companies are defined and, thus, how they should be regulated is of great importance to their profitability and survival. Furthermore, as the companies operate in public space, they are subjects for protection or strict enforcement, particularly by local transport police.

2.7 Summary and the way forward

In this chapter I have outlined debates and concepts associated with platform mobility, with a focus on the Chinese context. The chapter started by outlining the problem that platform mobility is often portrayed to solve, namely decarbonizing the transport sector. Drawing on transitions studies, in particular, I have outlined some barriers to decarbonization relating to built physical infrastructure, sociocultural aspects, and policy. Furthermore, I have argued that understanding the companies discussed in this thesis as “shared” is problematic. The reasons primarily relate to their profit-driven business models and oversupply rather than to resource optimization. I have also provided a brief overview of business models and the technologies that enable ride-hailing and dockless bicycles. Additionally, I have questioned the assumption of platform mobility’s contribution to decarbonizing the transport sector and discussed challenges to mobility justice. Beyond sustainability and just mobility, there are also controversies related to aspects such as obstruction of public space, business models, and data safety. I have sought to illustrate how platform mobility is a controversial sector, but how it can also be understood to align with political ambitions. Finally, I have outlined some key concepts and tools for understanding policymaking in China.

The empirical chapters (chapters 5–9) build upon and continue discussions from this chapter. However, I first present the theory and methods used during my research for this thesis.

3. Theoretical Frameworks and Relevant Concepts

As presented in the introductory chapter (Chapter 1), this thesis seeks to understand how platform mobility is embedded into China's mobility system. I aim to understand re-configurations of cars and bicycles over time and analyze the role of car ownership in contemporary China. The thesis also explores how platform mobility has become part of everyday practices and implications for justice, safety, and constructions of gender. In addition to looking at the everyday aspects, this thesis investigates how platform mobility companies have taken and eventually been given space by local authorities and how it has increasingly been integrated into state-led technological ambitions. This chapter presents the theoretical approach applied to analyze those processes. While the perspectives differ in emphasis, they all understand the social and technical as intertwined.

The chapter is divided into five main parts. The first part (section 3.1) covers perspectives that predominantly take a systems perspective: sustainability transitions research (STR) and platforms as infrastructure. In the second section (3.2) of the chapter, I explain my theoretical operationalization of a practice approach to the empirical material. My understanding of practice is based on two bodies of literature; the mobilities turn and domestication theory from an STS (science and technology studies) perspective. In section 3.3, I delineate the concept of 'mobility justice,' which I employ to shed light on how platform mobility may produce and re-produce inequalities. I have also dedicated a section (3.4) to lay out how I implement perspectives from the mobilities turn, STS, and STR. In the concluding section of this chapter (3.5), I explain the relevance of paying attention to both systems and practice in this thesis.

As such, this thesis draws on transitions studies, STS, and the mobilities turn, and I seek to contribute empirically to these fields. At the same time, in some chapters, I pay more attention to practices than systems and vice versa – although these elements are intertwined. For example, in the chapters that draw on user interviews (chapters 7, 8, and 9), the attention to practice is particularly salient. However, in Chapter 8, I also stress how systems are enacted through practice. While in Chapter 6, which focuses on regulatory negotiations, I pay particular attention to sociotechnical systems.

3.1 Platform mobility as a sociotechnical system and infrastructure

Before delving into a discussion of how platform mobility can be understood as a sociotechnical system, I will touch upon understandings of the sociotechnical from an STS perspective. Then I will outline the central ideas that characterize STR. After this, I will discuss mobility as an empirical focus within STR, and map out my understanding of platform mobility as a sociotechnical system. Thereafter, I will present an understanding of infrastructure from an STS perspective and an empirically oriented conceptualization of platforms as infrastructure.

3.1.1 A sociotechnical approach to sustainability transitions research

Understanding platform mobility (or any technological system) as sociotechnical implies the underlying recognition that both social and technical components are at play as systems grow (Hughes 2012) or wither. One implication is that we cannot understand working and function purely from the technology in itself. We also need to look at how technology is embedded in society (Pinch and Bijker 1984). Therefore, when seeking to understand a process of embedding, we need to consider aspects such as culture, norms, practices, politics, and institutions, all of which impact technology, and in turn, how technology is impacted by them.

Perceiving the social and technical (or material) as interwoven—as *sociotechnical*—is a central building block of STS. Perhaps it can even be understood as a uniting idea across different approaches and theories within the discipline. While STS has been central in developing and formulating the sociotechnical perspective (Bijker and Law 1994), the perspective has also become influential in STR (Sovacool, Hess et al. 2020, 2). This rapidly growing interdisciplinary research field studies the multifaceted process of turning our societies in a more sustainable direction (Markard, Raven, and Truffer 2012). Therefore, *sociotechnical* change, such as formulated by Bijker (1997), and the version with the often hyphenated spelling form, *socio-technical* approach, as understood in the sustainability transitions literature (Geels 2012), build on the same core ideas. However, there are also differences in their emphasis and approach. In the following, I, therefore, discuss what a

sociotechnical approach from an STR perspective entails and how it serves as a valuable perspective for the discussions in this thesis.

Although, many research fields address sustainability and climate action, sustainability transitions research differs in several ways. First, it differs in the manner of scope. Sustainability transitions research primarily looks at changes at the meso-level, thus situating itself between the micro- and macro-levels. Hence, the aim is to go beyond explanations such as the functions of capitalism (macro-level) or changing individuals' actions (micro-level) (Köhler et al. 2019). In this thesis, I attempt to strike a balance in terms of analytical level. For example, I include individual life experiences but also seek to understand them within cultural norms and larger socioeconomic changes. Furthermore, while I discuss large-scale socio-economic changes and processes of commercialization, I am primarily interested in the impact of such processes 'on the ground.'

Second, within sustainability transitions research, innovation processes are understood as non-linear, meaning that, for example, new technologies do not move from basic research to sales in a direct manner (Köhler et al. 2019). In this thesis, I showcase how platform mobility is intimately connected to other sets of technologies, and how they build upon and reconfigure interrelated sociotechnical systems. I do not explicitly focus on innovation processes. Instead, I illustrate the complicated interactions and negotiations with sociotechnical systems.

Third, there is an explicit focus on long-term processes within sustainability transitions research, often decades (Köhler et al. 2017). While my primary focus is on developments since the introduction of platform mobility¹⁴, I also seek to understand these relatively recent developments in light of changes since the establishment of the People's Republic of China in 1949. In other words, I ask how platform mobility can be understood as building upon and reconfiguring transport technologies with a much longer history.

Fourth, as stated in the research agenda of the Sustainability Transitions Research Network, there is a clear normative implication of the field, particularly in pointing out that public policy should play a guiding role in making our societies more sustainable (Köhler et al. 2019). I believe that the case of platform mobility serves to highlight this point. Without ground rules set by public bodies, achieving a more sustainable form of platform mobility is unlikely to happen.

¹⁴ For ride-hailing since 2012, and for dockless bicycles since 2015.

Fifth, from a sociotechnical perspective, STR entails a comprehensive analysis of a wide array of actors and how they interrelate (Geels 2012). Relevant actors should not be limited to policymakers and manufacturers but should also include NGOs, start-ups, media outlets, engineers, consultants, and research institutes (Geels et al. 2017a; Sovacool, Hess, et al. 2020; van Rijnsoever and Leendertse 2020). Furthermore, the interaction between actors and sectors should be taken into account (Geels 2012). Importantly, sociotechnical systems should be understood as maintained by the interaction of various groups (Geels 2012). In this thesis, I, for example, address how academics, private companies, and governmental bodies uphold platform mobility and collaborate on producing information about them. Furthermore, people's actions should be understood as shaped and motivated by a number of aspects, including economic, cultural, and social norms, conventions, and habits (Kemp, Geels, and Dudley 2012). In Chapter 6, I seek to nuance narratives communicating that platform mobility companies act purely out of cynical interests. As such, I show how various motivations are at play. I further highlight that pre-established mobility practices inform how platform mobility is used, thus paying attention to habits.

Sixth, as the name 'sustainability *transitions* research' implies, specific attention is paid to change and stability (Turnheim and Sovacool 2020). A fundamental recognition of the field is that sustainability will entail changing deep-rooted aspects of how we organize our societies at a social and material level, thereby breaking strong path dependencies and lock-ins (Markard, Raven, and Truffer 2012). Research within STR thus seeks to conceptualize and explain how radical changes can happen in how we can organize our societies and provide necessary services more sustainably (Köhler et al. 2019). Thus, bearing in mind the aspect of change, it is timely to question the potential of platform mobility. For example, to what extent does platform mobility represent the reproduction of existing unsustainable transport practices and technologies?

3.1.2 STR, mobility, and platform mobility

Mobility has long been an important focus of sustainability transitions research (Köhler et al. 2019; Kemp, Geels, and Dudley 2012). Since the early 2010s, the field has been applied widely to studies of mobility systems (e.g., Geels 2011; Loorbach, Frantzeskaki, and Avelino 2017; Schwanen 2016; Sengers and Raven 2014). Within the empirical focus on mobility, there is a wide variety of topics and technologies, such as the automobility system (Marletto

2014), electric vehicles (Orsato et al. 2012), niche innovations, and smart mobility (Manders, Wiczorek, and Verbong 2018). The STR perspective has also been used to analyze transport systems in a Chinese context (Tyfield 2014; Tyfield and Zuev 2018). Due to their structural characteristics, STR is well-suited to study mobility systems; transport infrastructures are durable entities and thus, difficult to change. Transport infrastructure tends to last over long periods of time and, therefore often serves as lock-ins to unsustainable practices.

With regard to road transport, Geels et al. (2017a, 465) have sketched out a “schematic Figure of Socio-Technical System of Auto-mobility.” The figure includes regulations and policies, maintenance and distribution networks, industry structure, markets and user practices, fuel infrastructure, vehicles, culture and symbolic meaning, and road infrastructure and traffic systems (Geels et al. 2017a, 465). Building on the figure presented by Geels et al. (2017a, 465), I have outlined the following figure (Figure 5) for platform mobility in China,¹⁵ in which the encircled texts indicate the focus of this thesis.

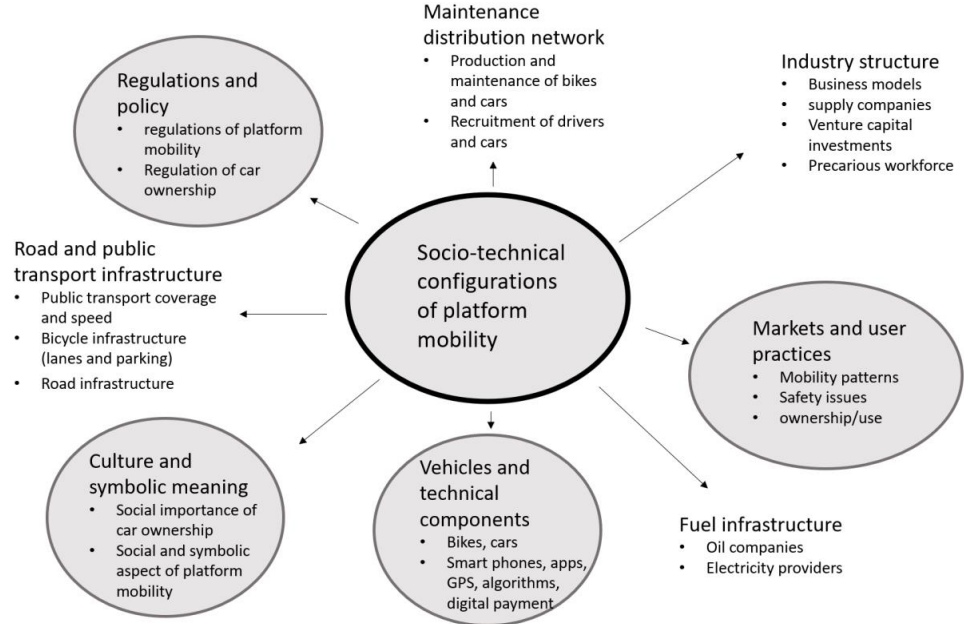


Figure 5. Platform mobility in China (based on Geels et al. 2017a).

¹⁵ Although Figure 5 shows the Chinese context, many of the same elements can be recognized for platform mobility across different geographies.

While the figure in the article by Geels et al. (2017a, 465) and my figure (Figure 5) have many similarities, there are also important differences between them. First, platform mobility is, by definition, interconnected with digital systems. Systems such as GPS (global positioning system), allocation algorithms, digital payment, social media apps, and smartphones are central artifacts in the allocation of drivers to passengers in real-time and the unlocking of dockless bicycles. Therefore, when analyzing digital systems, such aspects should not be regarded as a part of the background, but rather as a central part of the analysis (Sareen and Haarstad 2021). Second, the structure of companies in the platform mobility industry differs from many other companies in the road transport sector. Notably, the platform mobility companies have relied on large streams of venture capital from the beginning, which has contributed to a highly volatile market with many start-ups and bankruptcies (T. Gu, Kim, and Currie 2019). In addition, the platform mobility industry relies on a highly precarious workforce and often the use of contractors rather than employees (Noesselt 2020). Third, maintenance structures are configured in distinctive ways, and bicycles and cars are maintained by the companies (Mao et al. 2021). Fourth, when analyzing culture and symbolic meaning, I argue that this should be understood in tandem with private ownership of vehicles.

At the same time, for the sake of the feasibility of the research project on which this thesis is based, I needed to focus more on certain aspects than on others. Therefore, as the circles in Figure 5 indicate, I focus on certain aspects of platform mobility. These choices depended on a combination of data access (Chapter 4), aspects in need of more empirical treatment, and what I considered to be the most central aspects of platform mobility.

To summarize, from an STR perspective, platform mobility can be understood as a sociotechnical *system* consisting of various sociotechnical *configurations* (such as cars, QR codes, apps, and user practices). With Figure 5, I aim to provide a roadmap to this thesis and show the variety of aspects I shed light on. The “success” of platform mobility cannot be understood by only looking at the companies themselves, but also by how they are embedded in society through sociotechnical configurations. In this manner, perspectives from STR are well-suited for understanding the embedding of platform mobility. In the next section, I will continue to explore platform mobility as a sociotechnical system but through the lens of

infrastructure. In the following, I will also highlight how infrastructures can be understood to be enacted through practice and that they may become exclusionary.

3.1.3 Platforms as infrastructure

As sociotechnical systems grow, they may gain ubiquitous properties. In other words, as platform mobility becomes increasingly encompassing, navigating outside it might pose challenges. Such challenges can, for example, arise as accessing taxis without a smartphone becomes increasingly difficult. Looking at platform mobility as infrastructure thus sheds light on the encompassing, pervasive, but exclusionary potential of platform mobility.

In this section, I introduce the idea of understanding platforms as *infrastructures* (Plantin et al. 2018; Plantin and De Seta (2019) or as *digital utilities* (J. Y. Chen and Qiu 2019). These two interrelated ideas shed light on how digital systems function as layers and build on existing digital and non-digital infrastructures. The process can lead to digital systems being understood as infrastructures in their own right. This literature is mainly rooted in communication studies but draws on perspectives from STS scholar Susan Leigh Star's work on infrastructure (Kornberger, Pflueger, and Mouritsen 2017; Q. Wang et al. 2012; R. Zhou and DiSalvo 2020). Therefore, I will first discuss her work. Then I will cover literature that focuses on platforms and emphasize contributions based on empirical studies from a Chinese context.

Star (1999) argues for a relational understanding of infrastructure. In this sense, infrastructure emerges for people through practice (Star and Ruhleder 1996). What is understood as infrastructure varies according to specific situations and who engages with it. For platform mobility, this can, for example, imply that while allocation algorithms for ride-hailing may function as infrastructure for a person wanting to order a car, for an algorithm engineer, it is what Star (1999, 380) calls a "topic." Furthermore, while dockless bicycles might represent mobility for one person, they might represent immobility for a person with vision impairment. In Star's (1999) words, one person's infrastructure is another person's barrier or difficulty. Infrastructures will inevitably enable access and activities for some while restricting them for others (Star 1990, 1999; Star and Ruhleder 1996), or as Star (1990, 43) states: "A stabilized network is only stable for some, and that is for those who are members of the community of practice who form/use/maintain it."

Star and Ruhleder (1996) argue that we should ask *when* something is infrastructure rather than *what* infrastructure is. Answering this question can be done with reference to eight analytical concepts. *First*, infrastructure is characterized by when there is *embeddedness*, which means that infrastructures are “sunk” (Star and Ruhleder 1996, 113) into other sociotechnical systems. *Second*, infrastructure is characterized by *transparency*, meaning infrastructure exists and is ready to be used when needed. Thus, it also has a degree of invisibility in helping people to perform a certain task. *Third*, with regard to *reach and scope*, infrastructures are extended in both spatial and/or temporal scope; therefore, it does not merely support an isolated task. *Fourth*, infrastructure is *learned as part of membership*, implying that familiarity with using infrastructure is part of what people learn from being a member of a community. *Fifth*, infrastructure *links with conventions of practice*—infrastructures are interwoven with the conventions and practices of a community. *Sixth*, with regard to *embodiment of standards*, while infrastructures often build on existing standards, it is often in conflict with conventions. *Seventh*, infrastructure is *built on an installed base*, meaning that infrastructures are built on other existing systems and infrastructures and thus they will also reproduce the strengths and limitations of other sociotechnical systems. *Eighth*, infrastructure *becomes visible upon breakdown*; although the understanding of infrastructure should not be limited to something sinking into the background¹⁶ (Star and Ruhleder 1996, 112), it is much more noticeable when it breaks down (Star and Ruhleder 1996). As noted by Bowker and Star (2000), the easier infrastructure is to use, the harder it is to see.

I do not aim to verify whether platform mobility is an infrastructure according to the understanding of Star and Ruhleder (1996). Still, I argue that thinking in terms of this conceptualization is valuable precisely because it facilitates understanding infrastructure as relational and appreciating its encompassing and exclusionary properties.

A growing body of literature has empirically investigated how platforms in China gain infrastructural aspects (e.g., J. Y. Chen and Qiu 2019; Plantin and De Seta 2019; Z. Zhang 2021). Much of this literature understands infrastructure as a process or as “infrastructuralization,” where platforms become increasingly difficult to avoid when engaging in everyday activities, thus also highlighting how this ubiquity can act as exclusionary. The literature also empirically shows how platforms build on existing systems and act as system builders. These perspectives not only focus on platforms that have similar

¹⁶ Edwards (2003) argues that there is a Western bias in understanding infrastructure as visible upon breakdown, as this certainly not always the case for the Global South.

attributes to more traditional infrastructures but they also examine more widely the “indispensability and entanglement of platform in everyday life” (Z. Zhang 2021, 223).

Plantin and De Seta (2019) convincingly show how the social media app WeChat has become an almost critical part of life in China. Through digital payment, social networks, and integration between apps, WeChat is thoroughly incorporated into central functions of everyday life. Hence, it is described as including “properties that are typically associated with infrastructure, such as scale, ubiquity, and criticality of use” (Plantin and De Seta 2019, 258). Of particular empirical relevance is a study by J. Y. Chen and Qiu (2019) that investigated Didi Chuxing as a system builder, as well as the conditions under which the “infrastructuralization” of platforms happens. By becoming not only a mediator of taxi booking but also a necessity to hail a taxi, J. Y. Chen and Qiu (2019) argue that the apps offer a service similar to, for example, electricity providers, thus representing a new digital form of utility. This argument thus echoes the argument made by Plantin and De Seta (2019) by understanding certain platforms as ubiquitous through their connections with various everyday functions.

Furthermore, several contributions to the discussion of the “infrastructuralization” of platforms provide valuable insights into the analysis of changing power relations between the Chinese state and the platforms (J. Y. Chen and Qiu 2019; Z. Zhang 2021). The literature provides perspectives on regulations, policy responses, and cooperation with the state. In addition to the platforms’ “core” services (including ride-hailing, digital payment, and social media) being hard to avoid, the companies are increasingly engaging in cooperation with the state to “smarten” more traditional infrastructural functions. In other words, their system-building properties also reach the state apparatus. Therefore, the analyses in the literature are central to understanding platform companies’ relations to the state, as discussed in more detail in Chapter 6.

Perspectives on infrastructure as, for example, “large technical systems” (e.g., Mayntz and Hughes 2019), have been criticized for downplaying the role of users and agency (Skjølsvold 2015). For this reason, the experiences of the users, and not just the system builders, is a central part of my analysis in this thesis. Accordingly, perspectives on “infrastructuralization” of platforms that draw on Star’s work, which also focuses on everyday habits and the role of the users (Plantin et al. 2018), contribute to the understanding of human agency in the face of digital platforms. Furthermore, while the perspective has parallels with sustainability

transitions research perspectives on sociotechnical systems, understanding platforms as infrastructure adds additional nuances as it is developed to understand processes closely linked to the empirical case of this thesis.

To summarize, this section has covered perspectives that focus on how systems grow, are tied together, intertwined with other systems, and become ubiquitous. Together, these perspectives are well-suited to seeing the larger perspective, understanding change, and understanding exclusionary aspects. At the same time, particularly transitions studies have been criticized for offering a too compartmentalized perspective on the sociomaterial world (Åm 2015). In other words, while sustainability transitions research offers a perspective on how change happens, the framework may be regarded as overly static (Korsnes 2015). In addition, the understandings of Plantin and De Seta (2019) and J. Y. Chen and Qiu (2019) may downplay the ground-level workings of everyday life and actors' ability to negotiate infrastructural aspects, which is something I want to highlight in this thesis. Therefore, in the following, I will present understandings that highlight how users negotiate these systems. To shed light on how mobility is embodied, represented, culturally constituted, demanding different forms of knowledge, and practiced, I use perspectives from the mobilities turn, and domestication. I continue this chapter by presenting the mobilities turn, before moving on to discuss domestication theory.

3.2 Practice approaches

In a general sense, practice approaches understand practice as embodied, materially mediated, and based on different forms of knowledge and meaning (Schatzki 2001). It is by viewing practices as something collective and materially mediated that theories of practice differ from a perspective focusing on choices (Shove 2010; Watson 2012). In this thesis, I do not apply 'Practice theory' as understood by Theodore Schatzki and Elizabeth Shove. Instead, I draw on "constellations of mobility" (Creswell 2010, 2016) and the dimension model of domestication theory (Sørensen 2006) to understand how technology and mobility are embedded through practices, which is situated within the mobilities turn and STS. I will

introduce these perspectives in sections 3.2.1 and 3.2.2, and return to a discussion of how I integrate them into my analysis in section 3.4.

3.2.1 The mobilities turn

Since the 1990s, the so-called “mobilities paradigm” or “turn”¹⁷ has become one of several dominant approaches to the study of not only transport but also wider societal issues (Temenos et al. 2017). The mobilities turn grew out of a critique of a lack of focus on mobility in the social sciences and humanities (Sheller and Urry 2006).¹⁸ Its proponents argued for taking “the actual fact of movement seriously” (Cresswell 2010, 18) and foregrounding mobility (Faulconbridge and Hui 2016). At the same time, also the “moorings” of mobility and what hinders movement are vital aspects of the mobilities turn (Cresswell 2016). Central contributors to the field, Mimi Sheller and John Urry, argue that mobility is one of the cornerstones of the understanding of contemporary societies, including urban and global mobility, and even virtual mobility (Sheller and Urry 2006). Therefore, movement should be regarded as a significant way of understanding our societies (Faulconbridge and Hui 2016; Ingeborgrud et al. 2020). By doing so, the mobilities turn sought to validate mobility as an important empirical focus (Faulconbridge and Hui 2016), and it emphasized the role of travel, globalization, and movement in our contemporary world (Ingeborgrud et al. 2020). Sheller and Urry (2006) argue that previously travel has been “black-boxed” and thus regarded as a neutral set of technologies and processes that have been seen as less important than other social processes, which are more commonly studied in, for example, sociology. By arguing that a mobility paradigm has taken place, Mimi Sheller and John Urry observe a change in that social scientists have opened their eyes to its importance, thereby bringing analysis of mobility out of merely the realm of transport research. In other words, they seek to go beyond the perspectives of transport research and conventional social science. Therefore, there is a need for a more nuanced and holistic understanding of mobility (Cresswell 2010; Temenos et al. 2017).

¹⁷ Due to similarity with other disciplines and frameworks, it may be unclear as to whether the mobilities paradigm can rightfully be regarded as a paradigm (Hansen 2016), such as Sheller and Urry (2006) put it. At least in a stricter Khunian sense of the word, in many ways it may well be a “normal science” (Cresswell 2010). Therefore, it might be more relevant to refer to the mobilities paradigm as a “turn” (Hansen 2016)

¹⁸ However, Faulconbridge and Hui (2016) argue that Sheller and Urry’s contribution from the mid-2000s was rather one of “curation and categorization,” as there had already been decades of studies of mobility within SSH.

Further, mobility cannot necessarily be understood by using established theoretical frameworks in sociology (Faulconbridge and Hui 2016). In order to understand mobility, we need to understand it on its own terms (Faulconbridge and Hui 2016). Cresswell (2010) points out that studies of mobility in practice will certainly focus on some aspects over others. Still, there is a need to approach mobility in a comprehensive manner. In line with this way of approaching mobility, I seek to approach the case of platform mobility through a lens that constitutes several theoretical approaches which are presented in this chapter. While mobilities may represent a shift in thinking, the new thinking does not pose a grand theory of mobility but rather a set of heterogenous theories, questions, and methodologies (Faulconbridge and Hui 2016). Still, across the mobilities turn, there is a focus on experiences, embodiment, and sociocultural constructions of mobility, rather than solely on the functional aspect of travel (Faulconbridge and Hui 2016).

As a result, the research within mobilities encompasses a comprehensive set of empirical cases analyzed with a wide range of tools. With regard to the context of China, there are, for example, qualitative studies (J. (Jun) Zhang 2019), ethnographic studies (Chio 2011), and historical studies (D. (Dan) Wang, Kirillova, and Lehto 2020). Furthermore, the mobilities perspective has been applied to study a variety of empirical cases in China, including studies of tourism (H. Xu, Yuan, and Li 2019; D. (Dan) Wang, Kirillova, and Lehto 2020), rural mobility (C. Liu et al. 2019), public transport and e-bike taxis (Xia 2020), and the Belt and Road Initiative (Scuttari 2020).

Furthermore, drawing on the mobilities turn, several academic articles specifically analyze platform mobility in China. Spinney and Lin (2018) critically examine the transformative potential of dockless bicycles in Shanghai. In addition, a central journal of the field, *Mobilities*, published a special issue on the platform economy in 2022 (for the introduction to the special issue, see: Gibbings, Frey, and Barker 2022). In this special issue, two articles draw on the Chinese context. Xing (2022) investigates the impact of ride-hailing on taxi drivers' social communities, and J. (Jun) Zhang (2022) examines the embedding of dockless bicycles. I will engage with these three articles in the empirical discussions in this thesis.

In short, the mobilities perspective is a comprehensive umbrella, first and foremost demarcated by empirical focus and a sociotechnical lens. From this plethora of perspectives, I want to highlight aspects that are particularly relevant to this thesis, namely constellations of mobility and mobility justice.

Constellations of mobility

The embodied, experienced, symbolical, and spatiotemporal dimensions of mobility are made apparent through Tim Cresswell's constellations of mobility (Cresswell 2010, 2016). I support the argument of Gibbings, Frey, and Barker (2022, 636) that Cresswell's perspective inspires approaching platform mobility attuned to the dynamics of mobility in specific geographies.

Cresswell (2016) offers the following three analytical categorizations: movement, representation, and practice. Movement refers to "getting from one place to another" (Cresswell 2010, 19). Physical movement is the measurable aspect of mobility and refers to the time and speed at which movement happens (Cresswell 2016). Furthermore, "the representations of movement give it [movement] shared meaning" (Cresswell 2010, 19). Such representations can be simultaneously shared and conflicting. For example, intercontinental recreational travel can be associated with both environmental degradation and freedom. Included in Cresswell's 'movement'-category there are various shared representations of the "tools" we use to travel, such as expressed in car commercials (Cresswell 2016). Lastly, there is the aspect of practice, which refers to the experienced and embodied aspects of mobility (Cresswell 2010). By practice, Cresswell (2016, 165) refers to the everyday understanding of the word, including in a more theoretical sense. Drawing on Bourdieu's understanding of practice (Bourdieu 2019), Cresswell (2010, 2016) seeks to focus on routinized practices set in particular social situations over individual choices. Mobility as embodied, can include aspects such as frustrations due to traffic jams, sore feet after a long walk, and fear of walking through a dark alley at night. Particularly in Chapter 9, which analyzes self-protection practices, I aim to emphasize the importance of understanding how platform mobility is experienced and feels.

In short, Cresswell (2016, 165) states: "mobility as practiced brings together the internal world of will and habit, and the external world of expectation and compulsion." It is important to include the practices and embodied aspects of mobility, as this is the level at which mobility patterns are reproduced and changed (Cresswell 2016, 165). When applying this perspective in empirical analysis, the analytical constellations will be entangled and not necessarily easily distinguishable (Cresswell 2010, 2016). In the following, I will lay out domestication theory and explain how I apply both perspectives in the empirical analysis.

However, before doing so, I will discuss and explain how I relate to the concept of delegation in this thesis.

3.2.2 Domestication theory, delegation, and scripts

Initially, Roger Silverstone's theory of domestication was developed to study media technologies in homes (Silverstone and Hirsch 1992). Silverstone's ideas were based on phases of domestication, but they were further developed within STS into a model based on dimension (Haddon 2007; Lie and Sørensen 1996). With the development of the dimension-based domestication theory, this theory was applied outside the realm of the home and applied to a wider array of technologies (e.g., Anfinssen, Lagesen, and Ryghaug 2019; Berker 2011; Finstad, Aune, and Egseth 2021; Korsnes, Berker, and Woods 2018; Ryghaug, Holtan Sørensen, and Næss 2011; Suboticki and Sørensen 2020; Østby 1995). Because the *enactment* of technology (Sørensen 2006) is at the heart of empirical analysis, I understand domestication theory as a practice approach. In the following discussion, when I refer to 'domestication theory' or 'domestication', I refer to the model based on dimensions.

Domestication theory is influenced but also deviates from Actor-Network Theory (ANT). In terms of influence, it draws on the concepts of 'script'¹⁹ and 'delegation', which were developed within a broader ANT approach. First, the notion of technological scripts implies that designers' and developers' values, aspirations, and assumptions are "carved" into materials and technologies (Akrich 1992). As such, the intention of how technologies should be used is enacted through their production. At the same time, this does not imply a notion of technological determination. Rather, through use, people can negotiate and resist scripts (Akrich 1992). Simply put, technologies are often meant to be used in a certain way, but they are not always used as intended. Second, within domestication theory, as in STS as such, delegation implies that human actors translate, displace, or shift work (Johnson(Latour) 1988, 299) performed by human actors over to materials, technologies, human, and non-human actors (for empirical studies drawing on domestication theory and delegation, see for example Skjølsvold et al. 2018; Carter, Green, and Thorogood 2013; Asdal and Hobæk 2016). To be sure, different tasks can also be delegated to a combination of human and non-human actors (Suboticki and Sørensen 2020). In this thesis, the concept of delegation and script is

¹⁹ While also criticized within domestication theory by Sørensen (1994, 13-15)

particularly useful in Chapter 9, in which I aim to understand how users negotiate the script of security technologies and delegate safety work to non-human actors.

As mentioned, there are also differences between ANT and domestication theory. Traditionally, ANT has focused on the *production* and flow of technology and knowledge (Sørensen 1994). As such, the sites in which knowledge is produced have been empirically prioritized over the user perspectives (Sørensen 1994). Furthermore, I would argue that domestication theory is more applicable as it lays out analytical categories, or as put by Sovacool and Hess (2017, 720) ANT is “less structured and less systematically laid out” than other approaches within STS and STR. Therefore, partly from a pragmatic motivation, I draw on domestication theory in this thesis.

Dimensions of domestication

The three dimensions of domestication theory are practical, symbolic, and cognitive (Sørensen 2006). The first dimension covers routines and patterns of use, as well as the establishment of institutions built around technologies. Paying attention to users’ practices can, for example, highlight that new building technologies might meet more resistance if the script conflicts with established living practices (Korsnes, Berker, and Woods 2018). The symbolic dimension points to the production of the meaning of the technology. This dimension also covers identities that are constructed around users of technologies and even the technologies’ wider sociotechnical context. For example, bicycle infrastructure may act as a symbol of a future-oriented city (Suboticki and Sørensen 2020). Lastly, the cognitive dimension refers to the question of what knowledge is needed to use the technology and what type of knowledge is developed through use. The cognitive dimension is readily apparent considering the amount of knowledge necessary to domesticate online games (Ask and Sørensen 2019).

While domestication theory directs our attention toward how technology is “tamed,” as a co-productionist perspective, it also presupposes that this is not a one-way process (Sørensen 2006). Similar to the way that early humans changed when domesticating animals, we modern-day humans change when making technologies a part of our lives. Thus, as a perspective rooted in STS, domestication theory is aimed at understanding the mutual shaping of technology and the social (Berker 2011). The influence from ANT is apparent in

the notion of mutual shaping. It is not simply that we make technology our own. The network of humans and non-humans around technology is certainly not left untouched.

As a continuation of the above-mentioned point, it is important to note that while the practical, symbolic, and cognitive dimensions are identified as separate analytical categories, they should be regarded as having mutual influence. The manner in which technologies become a part of our everyday routines impacts what knowledge we acquire. In turn, our knowledge about a given technology may affect what it represents to us. Take, for example, the domestication of the electric vehicle (EV). While perhaps some users initially understood the EV as a second vehicle to a fossil fuel-powered car, with integration into everyday practices and learning about driving range and battery capacity, it may come to represent the most practical vehicle in a household (Anfinsen, Lagesen, and Ryghaug 2019; Ryghaug and Toftaker 2014). Thus, the degree to which we separate between the practical, symbolic, and cognitive, and even distinguish between separate technologies, is primarily to make the sociotechnical world analytically manageable. This is elucidated by the example of platform mobility. Namely, platform mobility can be regarded as comprising separate technologies (a car, a bicycle, a smartphone, a set of codes), but it may also be understood as an entity. In Chapter 8, I aim to make this clear by entangling the sociotechnical system that platform mobility consists of and present an understanding of how pre-learned skills ease the domestication of platform mobility. At the same time, in Chapter 9, I also show how driver-platform-vehicle constellations are understood as symbolic entities. As such, I argue that how we separate and analyze the sociotechnical world depends on the processes we aim to understand. Furthermore, domestication should not be regarded as a final or stable process (Lie and Sørensen 1996). How technologies are used often changes over time, and they can be de-domesticated (Lie and Sørensen 1996).

By continuing the discussion on infrastructure as exclusionary, I outline the concept of ‘mobility justice’ in the next section to show how inequalities can be produced and re-produced through mobility systems.

3.3 Mobility justice

Mobility and immobility are essential for understanding social differences (Cresswell 2010; Temenos et al. 2017; J. (Jun) Zhang 2019). For example, speed is associated with power relations, and mobility might reinforce and reconfigure such relations (Curran and Tyfield 2020; Zuev 2018). This point has been further developed in recent years and formulated by Mullen and Marsden (2016) and Sheller (2018) as *mobility justice*. In the following, I will focus on the understanding of mobility justice by Sheller (2018).

In shifting the discussion from transport justice to mobility justice, Sheller (2018) argues for a more comprehensive understanding of justice, not one limited to access to places (see also Mullen and Marsden 2016). Transport justice has primarily centered on accessibility, such as day-to-day policymaking regarding accessibility and urban planning. However, Sheller (2018) argues that we should also bring in a wider range of issues. Drawing on feminist theories, Mimi Sheller's understanding of mobility justice requires attention to who is a part of policy processes, what types of knowledge are included in the processes, and the language used, in terms of both actual language and wording. In other words, attention should be paid to procedural and epistemic justice. Feminist theories focus attention beyond access to include which bodies have access and by which means. Furthermore, Mullen and Marsden (2016) and Sheller (2018) highlight that the negative impacts of transport should be included in the concept of mobility justice. By looking at different dimensions of justice, Sheller (2018) argues that we are better equipped to analyze how, for some, a solution may have adverse mobility justice implications.

So how does the perspective of mobility justice apply to this thesis? I argue that platform mobility may reproduce existing mobility divides and create new ones. I also argue that platform mobility both hampers access to places for some population groups and entails additional emotional labor for different groups. Access to places and services is not only a matter of physical spaces and individuals' financial means but also a matter of notions of who can safely use which services, with what precautions, and at what times (Chapter 9). Furthermore, particularly in Chapter 6, I show how private actors take part in forming the future of mobility, and who shaped information about the mobility system.

Before concluding, I will provide reflections on how I implement the various traditions, concepts, and theories discussed in this chapter.

3.4 Implementing perspectives from the mobilities turn, STS, and STR

In this section, I provide my own reflections and draw on literature that discusses alignments and differences in the traditions, concepts, and theories covered in this chapter. In the following, I cover 1) the mobilities turn and STS and 2) the mobilities turn and STR. After this, I discuss and outline how I apply approaches to practice.

The mobilities perspective draws considerable inspiration from STS, particularly in its views on the role of materiality (Sheller and Urry 2006, 215). Furthermore, many concepts and ideas are overlapping, such as seeing sociotechnical systems as hybrids or taking a relational perspective on the agency and structure problem (Sheller and Urry 2006, 216). In both the mobilities perspective and STS, technologies are not understood as neutral or as determining societal development. Therefore, there is an overall alignment between STS and the mobilities turn in the notions of what the “social” world consists of and how technologies are understood. An expression of this is the argument that the car should not be understood as a neutral technology (Redshaw 2017). Rather, there are various automobility systems in which the interaction between the car and various societies appears strikingly different (Featherstone 2004). Thus, both the mobilities perspective and STS-perspectives seek to treat materiality and geographical characteristics seriously.

However, some aspects of the perspectives discussed in this chapter may also be deviant. At least some parts of STS thinking may question the ways in which, for example, Sheller and Urry (2000) deal with relations between the car and categories such as gender, race, and class. STS and the mobilities turn have drawn on sociology and partly have roots in it (Law 2008; Sheller 2014), as such categories have been and remain vital. Still, while such categories have been subject to critical scrutiny in STS (Grint and Woolgar 1995; Michael 2017), they remain more stable in, for example, understanding such as those of Sheller and Urry (2000) and Cresswell (2010) (see also Gibbings, Frey, and Barker 2022 for understandings of gender in the mobilities turn). That is, in the mobilities literature, they are often viewed as meaningful analytical categories that can be used to understand society, and they are not dependent upon the same level of enactment that STS require. It should be stressed that accepting gender as a useful analytical categorization does not imply a binary understanding (Cresswell and Uteng 2008, 1)

At the same time, the picture is certainly not clear-cut. Feminist approaches within STS have for many years called for a more active engagement with the power hierarchies of categories such as gender, race, and class (Berg and Lie 1995; Quinlan 2012). In short, there has been a comprehensive debate on the subject of how to bring gender into analyses without essentializing it as a category (Barad 2015; Cipolla et al. 2017; Grint and Woolgar 1995; Lagesen 2012; Wajcman 2000), which is a debate that is too comprehensive to be covered in this thesis. By applying perspectives from the mobility turn, particularly those represented by mobility justice discussed above, I seek to bring such categories more actively into my analysis. As such, I support the argument made by Berg and Lie (1995) that there is a need to be actively aware of gender relations (as well as other power hierarchies), as they may not automatically spring to mind when simply following the actors (as understood in ANT). In short, I would argue that we should not be so afraid of essentializing gender that we dare not touch it.

Furthermore, the mobilities perspective is in many ways complementary to STR, both in regarding automobility as a sociotechnical system and in advocating a comprehensive perspective, such as one including the cultural, symbolic, and material aspects of mobility (Featherstone 2004; Urry 2004). The mobilities perspective and STR have both focused on the aspect of change and stasis (such as lock-ins), for example in the automobility system (Sheller and Urry 2000; Temenos et al. 2017; Tyfield and Zuev 2018). Thus, a central question in both traditions is how changes occur in systems that consist of a range of aspects—manufacturing, energy, production, social status, the idea of freedom, and so forth—and how such aspects reinforce the automobility system.

By contrast, from a mobilities perspective, STR has been criticized for offering a too compartmentalized understanding of the configurations of mobility systems (Temenos et al. 2017). Thus, representations of mobility systems, such as the one represented in Figure 5, can be argued to underplay the interconnectedness and co-shaping of sectorial functions. An important aim of this thesis is to show how configurations of mobility systems are interwoven, such as how cultural understandings are negotiated through regulations and how maintenance can be understood in relation to the structure of the industry. In other words, the mobilities turn serves as a reminder to consider not only a wide array of configurations of a mobility system but also the interconnectedness between the configurations.

Additionally, there is a difference between the perspectives discussed in this chapter according to what is the main subject of empirical analysis. STR often gives a particular technology a center stage position, whereas the mobilities turn is centered more on the practice of movement (Temenos et al. 2017). Empirical studies of domestication concentrate on understanding technology-user relations. I take a somewhat middle ground between these perspectives; while focusing on the technology and its configurations, I also seek to understand how the system of platform mobility is produced, upheld, and challenged through practices. I would also argue that representations, such as the one presented in Figure 5, are useful precisely as representations. In other words, by necessity, theoretical frameworks need to offer simplified versions of a messy social world.

Lastly, I will explain how I understand domestication theory and ‘constellations of mobility’ to complement each other. The analytical categories of the two approaches are partly overlapping. While domestication theory operates with practical, symbolic, and cognitive dimensions, Cresswell (2010, 2016) distinguishes between movement, shared representations, and practice.

First, both Sørensen’s ‘practical dimension’ and Cresswell’s understanding of ‘practice’ contrast understandings of practices as deliberate choices and highlight that what we do is shaped by routines. While they are rooted in different academic traditions, sociology and ANT, I argue that in applying them in the empirical analysis in this thesis, they communicate much of the same ideas.

Second, symbolic dimensions (Sørensen 2006) and shared representations (Cresswell 2010, 2016) are understood in quite similar ways in these two bodies of literature. However, I would argue that the STS approach goes further in including symbolic configurations of users and not only transport technologies. At the same time, Cresswell’s concept highlights how these representations are socially enacted. In this thesis, I will take the somewhat pragmatic approach, and use these more or less overlapping concepts interchangeably.

Third, two concepts do not overlap, reflecting the traditions’ empirical focus. On the one hand, domestication theory highlights that learning processes (cognitive dimension) are involved in making technology a part of our lives. On the other hand, spatio-temporality is highlighted in Cresswell’s categorization, reflecting a particular attention to mobility. I argue that both ‘the cognitive dimension’ and ‘spatio-temporal movement’ are relevant for the empirical analysis in this thesis. As pointed out by Zhang (2019) we need to understand the

spatial distribution of platform mobility and how it is positioned to aid the managing ‘spatio-temporal demands’. In addition, the learning processes involved in embedding platform mobility are central to understanding the rapid uptake of these services.

3.5 Concluding remarks: systems and practice

This chapter has covered both perspectives on systems and approaches to practice. To summarize, I argue that practice approaches combined with attention to systems are a useful starting point from which to analyze platform mobility. STR reminds us to consider a broad set of actors and configurations, and to contribute with attention to change. While user practices and cultural and symbolic meanings feature in the STR perspective on sociotechnical systems, I argue that additional attention to practice is central to understanding the enactment of change. Thus, I follow the argument made by Watson (2012, 488–89):

practices (and therefore what people do) are partly constituted by the socio-technical systems of which they are a part; and those socio-technical systems are constituted and sustained by the continued performance of the practices which comprise them. Consequently, changes in the socio-technical system only happen if the practices which embed those systems in the routines and rhythms of life change; and if those practices change, then so will the socio-technical system.

Practice approaches and STR research have previously been used together to study empirical cases (Shove and Walker 2010; Svennevik 2022; Watson 2012). Furthermore, domestication theory has been combined with practice theory “to frame practical, cognitive, and symbolic dimensions of electric car use.” (Ryghaug and Toftaker 2014, 146). At the same time, I argue that approaching practices through domestication theory and the mobilities turn offers frameworks well positioned to study the introduction and use of mobility technologies. Accordingly, I use these two approaches to analyze how platform mobility has become a part of everyday life in Beijing through its connections to preexisting sociotechnical systems and how the change is enacted in everyday life. While my primary focus is on the sociotechnical configurations of platform mobility (such as technologies, mobility practices, and regulations), I also see platform mobility as a sociotechnical configuration of digital infrastructures.

The next chapter will cover methods used for collecting and analyzing the empirical material that this thesis builds upon.

4. Methods and Methodology

In this Chapter, I discuss the strategies and choices I made to gather and analyze empirical data. In the first section, 4.1, I explain how the research project changed over time and emphasize the importance of being flexible when doing qualitative research, particularly in a Chinese context. Next, in section 4.2, I discuss my experience of doing fieldwork in China. This discussion includes getting access and how the COVID-19 pandemic impacted the project (section 4.2.1). In section 4.2.2, I cover my experience with working with research assistants and discuss crediting them. In the following section, 4.2.3, I explain how I approached participation and observations and my experiences with the Chinese app economy. Accessing interviewees was a major part of the fieldwork, and I expand on how I thought about sampling and what recruitment strategies I employed in section 4.3. As using social media was an important tool for the interviewee requirement process, I have included this in sub-section 4.3.1. Then I provide a section, 4.4, on how I experienced the interview situations, containing the use of interview guides. Being wary when using written sources is important in the Chinese context, and I critically assess the use of written sources in section 4.5. While I provide notes on ethical concerns throughout this chapter, I have a focused discussion on this in section 4.6. In section 4.7, I argue that analyzing data is a form of enacting the social world and thus provide a discussion of how I transcribed, coded, and analyzed the interview data. The last section, 4.8, is dedicated to positionality and my role as a foreigner.

However, before I explain the methodological process, I position my methodological choices within an ontological context. I understand methods as performative. In other words, they are a part of what produces reality. Therefore, methods are not a neutral set of techniques for reporting what is already there (Law 2004, 143–156). Instead, methods can be seen as enacting the social world (Law and Urry 2004). For example, when we conduct interviews, we do not merely extract the meaning, opinions, and notions already held by the interviewee; there is something in that very situation that brings about a meaning that would not necessarily exist outside it. As such, the information from an interview situation can be understood as co-created by the interviewer and the interviewee (Holstein and Gubrium 1995). Furthermore, the products of our research, in turn, shape the social world. As stated by (Law

and Urry 2004, 393, methods “help to bring into being what they also discover.” Thus, as social scientists with our toolkits, we are also actors in meaning production. Methods are never innocent (Haraway 2006). Therefore, what we as social scientists observe is not reality itself but rather reality seen through a specific lens. Through this chapter, I endeavor to give a descriptive account of that lens. While this lens might be impossible for the researcher to articulate fully, I all the while will try my best to provide a descriptive account of how I approached data collection and analysis.

To clarify my overall approach to data collection and theory, throughout the data collection process, I aimed to strike a balance between different concerns: being open to where the data took me, sticking with my core interests of big data and platform mobility, and also staying adaptable to what kind of data I could obtain. I did not try to provide or disprove a given theory. Instead, I aimed for discovery over verification (Heimer 2006). Possible theoretical approaches were implemented only after I had collected and systematized the data. Furthermore, the organization of the data into different chapters is also a result of the data collection and subsequent systematization and analysis rather than a result of predefined topics of interest. While there were many moving parts in my research design, some stayed more stable than others. From the very beginning, the research project had a qualitative design, with semi-structured interviews. Documents served as a backdrop for development of the interview guides, while observations helped to make sense of interview data. In addition, the aim from the beginning was to adopt a case study approach. The reason for this choice is that case studies are suited for qualitative, empirical studies aimed at an in-depth understanding contextualized in a contemporary setting (Yin 2012, 4).

I strive to give an honest and detailed account of how I collected and analyzed data. The reason is that I want to display some of the mess that methods can truly be (Law 2004). I follow Heimer (2006) in arguing that method chapters can work better as a vessel for transferring knowledge and experiences when being open about adaptive practices. Thus, “glossing over problems encountered in field work [...] stalls constructive discussions on coping strategies for shared problems” (Thøgersen and Heimer 2006, 2).

4.1 Inching towards a scope: adapting and staying flexible

When I arrived in Beijing in March 2019, I aimed to study the role of transport companies working on Intelligent Transport Systems (ITS) and smart city development in urban China. In particular, I was interested in the workings of so-called “city brain” projects—collaborations between the state and private companies to optimize traffic flow through big data and AI. I was curious about what motivated both private and public actors to engage in such collaborations. This curiosity came from an overall interest in private actors taking part in traditionally state-held tasks. This issue is becoming increasingly pressing as private actors with big data resources are becoming a force to be reckoned with in the transport sector both within and beyond China. In light of these trends, it might be worth questioning whether companies without public accountability are given in the development of the transport system. More specifically, for the Chinese context, I was interested in how we can understand the increasing role of the private sector in a post-communist country. While this underlying interest remained with me throughout the research project, the end result turned out to be quite different than what I had first envisioned. As I reveal in thesis, instead of the main case for this thesis, city brain projects are used as one of several examples in Chapter 6, section 6.3. Furthermore, while I ended up writing more extensively about the negotiations and relations between public and private actors (see Chapter 6), the user/non-user perspective grew to be a central part of the final product (see Chapters 7-9).

In order to understand the “city brains” and possibly other forms of sharing of big data between government agencies and private companies, my plan was to conduct expert interviews with city planners, company employees (e.g., programmers, projects managers), researchers, and ideally government officials, all of whom would be regarded as experts in their field. However, over one month of the fieldwork passed by without any success in recruiting interviewees. In some instances, I was able to contact relevant interviewees in person or online, but they stopped answering when they learned more about my research project. It was unclear whether my inability to persuade people to talk about the ITC projects and big data was related to how I framed my project, secrecy concerning company projects, political sensitivity, hesitancy towards communicating with foreign researchers, or simply that the people were too busy. In short, I learned the hard way that as a foreigner doing research in China, having a narrowly defined sample of interviewees can often entail considerable challenges (Scoggins 2014).

As a consequence of the standstill in my fieldwork and discussions with my supervisors, I decided to broaden the scope and take a wider approach to platform mobility. Having to revise an original plan of whom to interview is quite common when doing research in China (Scoggins 2014). Therefore, to stay adaptable is often given key advice, both in the literature (Gustafsson, Blanchin, and Li 2016; Solinger 2006) and by fellow researchers in the field in China. Thus, despite the initial disappointment, I was not surprised that modifications to the original plan were necessary.

In the process of adapting my research plan, I made two main changes to my project. First, I approached the recruitment of interviewees (i.e., the experts) with a broader project pitch. I reframed my project pitch to address how relevant actors envisioned the role of platform mobility more generally in the transport sector and visions of how it could contribute to sustainability. Second, I decided to conduct interviewees with users and non-users of mobility platforms (see Appendix D for changes in project pitches). Compared to the original focus on the case of city brains and data sharing, the reorientation to platform mobility meant that the user perspective became much more relevant.

Similarly, the choice to conduct fieldwork in Beijing involved adaptation. The difficulty of accessing interviewees varies across different locations in China (see, for example, Heimer 2006 on interviewing cadres in different counties), and I was told by fellow researchers that Beijing was not the easiest location. Still, it made sense to have my base in Beijing, where I had my visiting researcher position. Throughout the fieldwork, I stayed open to visiting other places. I decided I would not travel on a whim but only if opportunities arose to conduct interviews or visit companies in other cities. In the end, all the interviews were conducted in Beijing or online. While the main focus of the thesis is on Beijing, the discussion in Chapter 6 covers other locations too. Furthermore, I decided it would be easiest to conduct user interviews within one city, as this would give richer data on one locality instead of attempting to cover too much ground.

4.2 Doing and not doing fieldwork in China

The lion's share of data collection for this thesis was done in Beijing between March and September 2019. Therefore, when writing about "fieldwork," I refer to that period of time and the observations, interviews, and information material collected then. In this section, I will discuss access to the field, working with research assistants, and participant observation. In the discussion on participation, I will also explain how I have thought about my participation in the app economy. First, however, I will provide some very brief notes on the city I conducted my research, Beijing.

Even though Beijing is a municipality, it has the same administrative level as a province, which means that it is under the direct administration of the State Council. The population is about 21 million, and it is thus a Megacity (over 10 million people). Beijing is divided into 16 districts of varying sizes (see Figure 6). During the fieldwork, the apartment where I lived the longest was located in a *xiaoqu* (residential community) in Chaoyang district, right at the border with Haidian district. Tsinghua University, where I had a position as a guest researcher, was located in Haidian district. Therefore, I spent most of my time in Haidian and Chaoyang, but I also regularly visited Xicheng district and Dongcheng district, located in the heart of Beijing. A more thorough discussion of the urban fabric is presented in Chapter 5, Section 5.2, and perspectives on understanding the Chinese state are presented in Chapter 2, section 2.6.



Figure 6. Map of China and Beijing. Wikimedia Commons

4.2.1 Access to the field

When I started my position as a PhD candidate at NTNU (Norwegian University of Science and Technology), my supervisors had already established a collaboration with a partner university, Tsinghua University, and a contact person. The collaboration considerably eased obtaining an invitation letter as a visiting researcher and applying for a visa. Certainly, for foreigners doing fieldwork in China, obtaining a visa can often be a considerable challenge. I also gained office space, supportive colleagues, and affiliation with one of China's top universities. Thus, the collaboration was a very good starting point for my research. As I had been conducting fieldwork in China before²⁰ without this degree of institutional collaboration, I was able to acknowledge its benefits fully.

However, the amount of time I could spend in the field was unpredictable. I entered China on a three-month visa and was able to renew it for a further three months. However, staying for nine months, as planned, proved to be more or less impossible. Shifting visa guidelines and unpredictability in terms of access is certainly a part of doing research in China.

When leaving China in September 2019, I was determined to go back after the following Spring Festival (Chinese New Year). I booked a ticket for January 2020 and started visa preparations. In December 2019, the news broke about the coronavirus outbreak in Wuhan. For a long time, I waited for a chance to return to China. I kept paying for my Beijing mini

²⁰ In 2017, I conducted a three-month fieldwork in Guangzhou on vehicle ownership restrictions

storage because I thought I would soon be able to return. At the time of writing, I have still not been able to return to China. Quarantine times have been unpredictable, visa acquisition has for a long time been impossible, and flight tickets have been expensive and difficult to obtain.

In recent years, qualitative researchers reliant on fieldwork in all parts of the world have been forced to think about data collection in new ways, often with very creative outcomes. Strategies include digital means for interviewing, moving fieldwork to digital spaces, conducting archival research, and relying on people living in the context that the researcher is aiming at understanding, who are also called “field citizens” (Krause et al. 2021).²¹ As China was one of the last countries to ease Corona-restrictions, some researchers working on China shifted their focus to Chinese influence abroad, the Chinese diaspora, or “surrogate fieldwork” (Thunø 2006, 245) in places such as Hong Kong, Macau, or Taiwan, echoing the days of highly restricted access to China prior to the 1980s (Thunø 2006).

For a long time, I contemplated various strategies for continuing data collection, for which digital interviewing appeared to be the most relevant. At the same time, the challenges of doing digital fieldwork should not be underestimated. For instance, the stress that the COVID-19 pandemic brought upon societies has made connecting with people previously unknown to the researcher more difficult (Gera and Hasdell 2021). Not being physically presented in China deprived me of access to many of the venues where I had previously used to get in touch with potential interviewees or people with relevant networks. Lack of face-to-face interaction also meant that establishing the trust needed to set up interviews would be challenging. During my stay in Beijing, my research assistants played an important role in building such trusting relationships. However, after I left China, they both ended up with a much stricter work schedule than in 2019. Consequently, if I had planned to have an intensive period of digital interviews, I would not have had to recruit new research assistants and build a list of interviewees with them. In short, there were considerable challenges to holding online interviews.

The practical-oriented methods literature on doing fieldwork often acknowledges that fieldwork can be a cause of considerable mental strain, and it often provides tricks and tips to the researcher on how to reduce stress and anxiety (Hagen and Skorpen 2016, 17–18;

²¹ There has also been ample knowledge sharing among researchers, such as a Google document listing alternative strategies, which can be accessed at: <https://docs.google.com/document/d/1c1GjGABB2h2qbduTgfqribHmog9B6P0NvMgVuiHZCl8/edit#heading=h.wij3gfk8lnro> (accessed 11 May 2023).

Scheyvens and Nowak 2003, 107–108). As researchers working through the pandemic, I would argue that there is still work to be done in putting into words how the lock-down had affected research beyond travel bans. In my case, I experienced difficulty in finding the initiative and energy to overcome the above-mentioned challenges and to continue to recruit interviewees online. Furthermore, researchers who rely on fieldwork, fellow researchers, and the literature often advise other researchers to find time during the fieldwork for what Scheyvens and Nowak (2003, 108) call “re-energizing activities.” However, when a society is on lock-down, the opportunities for such activities is much more restricted. An additional challenge for me with regard to starting data collection was that I was stuck in somewhat of limbo for the better part of a year; one month, I thought returning to China appeared to be possible within the time I had left for the project, and the next month it seemed impossible. In short, the uncertainty made it hard to commit to setting aside time for trying to collect data online.

A central issue for qualitative researchers is the question of when enough data have been collected. There are several questions a researcher can ask herself in this regard more or less idealized answers to this question (Charmaz 2014). In my case, the answer to the question stemmed both from the barriers to data collection and the process of analyzing data. At the time when the COVID-19 pandemic broke out, I had already spent six months in China and had conducted 31 interviews with 39 interviewees. Therefore, I had ample data to start coding, analyzing, and writing during lock-down. While I kept hoping to go back to China and contemplated the possibility of online interviewing, I had started organizing my empirical data into arguments and chapters. As Morse (2007) points out, qualitative researchers are not immune to the ideal in quantitative research that more is always better. However, I slowly gained confidence in the richness of my data during the process of transcribing and coding.

Ultimately, I conducted three digital interviews with mobility platform users after leaving China. I decided to stop at three, both due to the reasons outlined above and because the field had changed considerably. Perhaps unsurprisingly, the COVID-19 pandemic played such a prominent role in everyday mobility that interviewing a further 10–15 users would have entailed an entirely new focus area for my research project. Thoroughly covering the aspect of the pandemic was simply beyond the scope of my planned thesis and the remaining time available for research. While I integrated the interviews into the data material, I do not discuss the impact of the COVID-19 pandemic in detail.

Except for COVID restrictions, two of the three interviews (all user interviews) conducted after I left China were similar to those I had conducted in China as they centered around everyday mobility practices. However, one out of these three stands out. After almost finishing writing Chapter 5 on historical changes, I realized that a person in my personal network could contribute with her own experiences of growing up in Beijing. A more comprehensive discussion of this choice is provided at the beginning of Chapter 5.

In addition to the interviews conducted after I left China, interviewees and friends have kept me updated on relevant changes. For example, interviewees sent me relevant articles, and my research assistants sent me photos of, for example, changes in dockless bicycle parking. During the fieldwork, I took private Chinese lessons and continued to have weekly digital classes with my teacher after leaving China. These lessons provided a window for me to stay updated on changes in life in Beijing.

4.2.2 Working with research assistants

One of the first things I did when arriving in Beijing was to recruit research assistants. Due to my very limited Chinese skills, using a research assistant was central to making the fieldwork possible. That being said, lacking language skills also affected my ability to strike up informal conversations when moving around the city and gain a better understanding of what was happening around me in the urban environment. In the recruitment process, I used my personal network and spread the word that I was looking for an assistant through the social media app WeChat. I did not use professional translators but rather looked for good people with English proficiency, a flexible schedule, and an interest in or knowledge of the topic I was studying. In order to get an impression of oral English skills, I had informal coffees with the people who were interested in the position.

I landed on three people who I felt I could have a good collaboration with. Having multiple assistants allowed some flexibility in scheduling interviews after the interviewee's preferences and having an assistant available for relevant events. I paid the interviewees hourly for interviews, traveling, preparation, and discussions before and after the interviews.

The role of the research assistant was not restricted to interpretations. After the interviews were conducted with a research assistant present, we would often spend some time discussing the interview. We would discuss issues such as interpretations of what we had just heard and to what extent the interviewee had felt comfortable about sharing information. In a way, this

was, therefore, the first step of analyzing the data. The assistants were also able to explain cultural and language cues that I could not recognize. We also discussed how the interview guide worked and how the questions and framings could be improved for future use.

Using a research assistant for interpreting interviews had implications for the data collection process. When interpreting, details and nuance might be lost. In particular, I noticed that the interpreted version of the interviewees' answers would usually be shortened, which is likely necessary when translating on the spot. There might also be misunderstandings. Regarding language, I want to acknowledge that potential misunderstandings when communicating in English could stem from my side, as I, too, have English as a second language. In some instances, I was also unable to ask as many questions as the ones done in English due to time constraints.

Working with a Chinese student or research assistant for help with interpretation and notetaking can be a source of feeling inadequate. However, Thunø (2006, 246) notes that “within both the academic traditions of anthropology and China studies, fieldwork and the analysis of research results still seems to be first and foremost conceived as an individual task, although this ‘lone rider’ practice is disputable in terms of research methodology.” Therefore, working with a research assistant is a common but perhaps under-communicated practice of doing qualitative research in China (Thøgersen and Heimer 2006). Furthermore, I too experienced that “field work benefits from the synergy of diverse identities” (Thunø 2006, 255).

Crediting research assistants

Due to the research assistants' value to my work, I wanted to find a way to credit them properly. However, their contribution only fulfilled one out of four of NTNU's criteria for co-authorship, which follow the Vancouver recommendations. All four criteria must be met for a co-author to be recognized. I tried to find a solution for crediting their work which did not include co-authorship, and I asked the faculty for permission to include their names on the thesis's front page (“Thea Marie Valler with Bingbing Xia, Dingdi Zhao, Sitong Li”). Unfortunately, the faculty did not allow for this sort of crediting.

In light of this experience, I argue that research institutions should allow for a more inclusive way of accrediting people who, in practice, conduct research, as the final textual outcome is often only the tip of the iceberg of a research project. Still, the requirements for co-authoring

(and thus crediting) are centered around textual production. An increasing number of journalist have raised attention to how ‘fixers’ – who do integral work, in some contexts, at the risk of their safety – has been “unbylined” in foreign journalism (e.g. Borpujari 2019; French 2016; Oliver 2022). With reference to this debate, and in line with Heywood and Harding (2022) I argue that there is a need for a broader discussion within academia on the role of people who make research possible. While the answer might not be in the form of co-authoring status, there ought to be alternatives for recognizing the work of research assistants beyond acknowledgments.

4.2.3 Participation and observation

During my time in Beijing, I attended meetings, public lectures, talks, organized visits to companies, networking events, conferences, and exhibitions on topics such as smart city, AI, local air pollution, energy, and transport. The topics were all relevant to my research on platform mobility but were never the main focus of it. However, it was important to stay open to the opportunities that arose. My approach to fieldwork in China as part of my work for my MPhil and PhD degrees has been to aim wide and let people within a broadly defined field know what I am doing. Therefore, attending the above-mentioned events served the twofold goal of extending my network and gathering information.

During the fieldwork, I acted briefly as a consultant for an international organization, and my task was to write a report on smart city projects in China. In terms of conventional ideas of success, this was not among them. After some weeks of the engagement, I realized that the employer and I had very different expectations and ideas concerning my role and competence. Furthermore, finishing the project proved difficult due to my visa status because important meetings were scheduled to happen after I had to leave China. While it was certainly difficult to abandon the task, I concluded it was for the best of my project. Acting as an intern, seconded (Korsnes 2015, 81), or consultant can significantly contribute to fieldwork. At the same time, when taking on such engagements, it can be difficult to foresee what doors they will open and how much extra work they will include.

Blended lives and blended methods

Beyond attending events, conferences, meetings, and trying to work as a consultant, my everyday life in Beijing should also be understood as involving participant observation. Over

the six months I spent in Beijing, the platform economy became more important to me for solving everyday wants and needs. To borrow Herold's (2015) words, I was leading an increasingly "blended life." While Herold (2015, 190) uses the term to characterize the life of Chinese youth that includes "online and offline elements that interact with and complement each other," my own "blended" experiences were also part of my methods.

Accessing the Chinese app economy requires digital payment services, which in turn requires a Chinese bank account. While this was a somewhat complicated and time-consuming process, it was undoubtedly time well spent, as the bank account "unlocked" access to central everyday experiences and services. Accessing services such as dockless bicycles, ride-hailing, and online delivery was an important part of understanding my research topic. Therefore, access to the field was a matter of not only visas, plane tickets, and the COVID-19 pandemic but also access to China's online economy.

I found that using apps such as Dianping, WeChat, Mobike, and Didi helped the interview situation. Sometimes, the interviewee or I would suggest a coffee shop through a link to Dianping sent by WeChat. In other instances, the interviewee would ask me how I found the place or traveled there. If the answers related to parts of the Chinese app ecosystem, the interviewee would give some kind of recognition of my interest and investment in China, which would ease the further conversation. A minimum mastery of the apps was particularly important due to my low proficiency in Chinese; it served as a way to showcase my investment in China. I also found that it helped to lead the conversation in the right direction, giving the interviewees an idea of what I already knew. Thus, the use of the apps served as an important tool for avoiding the otherwise most basic explanations that could have taken up time from other research-related matters.

As a researcher within the mobilities field, having embodied experiences of the form of the mobility in question can make an important contribution to the research (Hansen 2016, 49–54; Sheller and Urry 2006). My firsthand experience of the apps helped me to relate to people's experiences, which was of particular importance during the user interviews. I had experienced how cycling could be a welcome break from the intense Beijing summer heat. I knew how frustrating it could be when the apps were slow and lagging. Time and again, I had experienced how unpredictable and slow it could be to get a taxi on a rainy day – and every time, telling myself I would not do that again. I also faced the stress of ending up with a broken bicycle when trying to get somewhere on time. Beyond the apps, living in Beijing

gave me firsthand experience of the tedious task of getting through the city, the predictable, efficient but crowded metros, the slowness of the buses during rush hours, and the infamous Beijing rush hours. I experienced the small rush of fear when unexpectedly being overtaken by an electric two-wheeler (e-bike) when cycling. All of the experiences helped me to make the interviews seem more like conversations, during which experiences were mutually shared, rather than simply me asking question after question. When my questions were unclear, I drew on my own experiences to encourage the interviewee to elaborate on their response.

At the same time, my own use of the app economy was not without ambiguity. I was a researcher on “sustainable mobility,” who had flown from Norway to Beijing, and I was using far more taxi, ride-hailing, and home delivery services than strictly necessary. Dinner ordered to services such as Meituan was not delivered without a certain sense of guilt, as it arrived in large amounts of plastic containers and underpaid delivery workers. While the apps made life in China easier (which felt urgently needed at the time), they also made it easier to make the “wrong” decisions. To give this a more pragmatic spin, not only feelings of freedom and convenience but also feelings of frustration and guilt helped me relate to various experiences when interviewing. As pointed out by Law (2004, 143–156), not only cognitive parts but also emotive parts of research should be understood as a part of methods.

4.3 Sampling methods and recruitment strategies

In this section, I will explain how I have categorized the interviewees, the sampling methods and recruitment strategies, and discuss using social media to recruit interviewees.

The interviewees were divided into two main groups: (1) experts and (2) Beijing residents/user and non-users of platform mobility in Beijing²². In the following discussion, I define these categories and how I approached sampling and recruitment for the two groups (see Table 3).

²² My understanding of «Beijing residents» is not limited to people holding a Beijing household registration (*hukou*).

Table 3. Overview of interviewees

	Specifications	Interviews	Interviewees
Users			
	Before COVID	15	17
	During COVID restrictions	3	3
	Total users	18	20
Experts			
	Employees/former employees, platform mobility companies	7	8
	Academics/researchers	3	4
	Urban planner	1	1
	Employee, SOE	1	1
	Legal advisors	1	2
	NGO	1	2
	Consultant	1	1
	Total expert	15	19
Total		33	39

I understand an “expert” as having two main features. First, from a pragmatic perspective (Meuser and Nagel 2009, 18), experts are people I (as a researcher) have identified as having relevant expertise. Second, in line with Meuser and Nagel (2009, 18), I also understand experts as having knowledge beyond everyday and common sense. While several of the experts worked in technical fields, it should be noted that I was not first and foremost interested in the experts’ technical competencies but rather in their experience with policy processes, collaborations, and their understanding of motivations being engaging in various technical projects (see Table 3, and Appendix E) I defined these interviewees as experts because they were either directly involved in the platform mobility sector, or had relevant research experience, or were stakeholders in the urban transport sector in Beijing. In other words, they held or had previously had jobs that meant they were relevant to my research. Therefore, they are experts in the sense that they have a form of specialized knowledge that is difficult to obtain elsewhere (Bogner, Littig, and Menz 2018). At the same time, the category “expert” can be considered problematic for two main reasons. First, we are all experts when it

comes to our own lived experiences (Morse 2007). In this sense, “users” could also be termed “experts.” Second, boundaries between lay people and “experts” are in reality blurred (Ryghaug, Sørensen, and Næss 2011, 781). For example, an interviewee I have categorized as a “resident” turned out to work for an investment company that had once considered, but eventually declined, to invest in Mobike. Still, for the sake of sorting out the mess of the social world, I decided to stick with the two categories; experts and users. The categorization is reflected in various chapters in this thesis: Chapter 6 draws on expert interviews, and Chapters 5, 7, 8, and 9 draw on user interviews.

I was interested in getting in touch with relevant stakeholders in the Beijing municipal government, such as representatives from the local transport commission, as the purpose of my research project was address the relationship between public bodies and platform mobility companies. I knew that this was an ambitious goal, since Government employees are not only difficult to interview in China but particularly difficult in Beijing, as Beijing politics are often regarded as more sensitive than elsewhere in the country. I was unable to hear the stakeholders’ views firsthand, but fortunately, I was able to interview people working with government relations, an interviewee who had previously worked in municipal planning, and people who had been involved in joint projects with the government.

The sampling methods I applied for the “expert” category can be loosely understood as convenience sampling, purposeful sampling (Morse 2007), and the snowball method (Tjora 2010). Convenience sampling is targeted at actors who have “experienced most of the phenomenon” (Morse 2007, 6). In purposeful sampling, interviewees are chosen based on the understanding that they have valuable knowledge and can provide rich perspectives about the topic at hand (Patton 2002, 40). While convenience sampling is often applied at the beginning of the process (Morse 2007), I chose to do it throughout the fieldwork due to the recruiting challenges. However, in the later stages of the fieldwork, I increasingly used purposeful sampling by concentrating my efforts on filling certain holes in my data material and identifying the most relevant actors. Furthermore, at the end of each interview, I asked the interviewee whether they had any suggestions for other people I should talk to, which was when snowballing came into effect. In some instances, I was given names of people whom I had already spoken to, which gave me a sense that I was on the right track. In other instances, the snowballing resulted in new interviews, but in other interviews it did not generate new contacts.

In practice, my sampling strategies for recruiting expert interviewees involved contacting people whom I wanted to interview, as well as people who might have had relevant networks. I started by reaching out to my professional and social network of researchers, acquaintances, and contacts from the time when I did my MPhil fieldwork, to whom I explained my project and the type of people to whom I was interested in talking. When arriving in China, I intensified the search for interviewees. I contacted online networks and NGOs in energy, transport, and sustainability. I also drew on contacts and events from a research project of which I was a part, TRANS-URBAN-EU-CHINA (Transition towards urban sustainability through socially integrative cities in the EU and in China). I even contacted the Norwegian Embassy, which resulted in the staff there inviting me to attend an external meeting. In addition, my colleagues at Tsinghua University were helpful in putting me in contact with relevant researchers. My academic contact person at Tsinghua is a reputable professor, and interviewees who were familiar with him were more open to talking to me. Moreover, I reached out to authors of academic and non-academic papers on platform mobility. I canvassed LinkedIn, sending a number of messages to people in the platform mobility industry. A further part of my strategy to meet potential interviewees was attendance at conferences, workshops, and exhibitions. Finding interviewees is a common challenge when doing fieldwork in China (Scoggins, 2014), so it was vital to cast a wide net and let many people know about my project. During my fieldwork, such challenges related to people not answering emails, building trust, sensitivity, identifying relevant interviewees, and the interviewee's busy schedule.

I also had a head start in my fieldwork because I had made previous trips to China as a part of my PhD project before doing fieldwork. In April 2018, I visited Shanghai and Beijing as a part of a research delegation, and in December of the same year I took part in a workshop in Wuhan. At those events, I came in contact with people who helped me with recruiting interviewees. The trips also allowed me to set up informal meetings with researchers to get input on my preliminary research ideas.

Some experts were recruited for interviews through my research assistants' personal network. I had not expected the research assistants to be of help in this manner, but as I came to realize, the companies are such big employers that the chance of knowing someone who knew someone else was, in fact, not that unlikely. The research assistants joined me during the interviews, and I realized it was much easier to have an informal and trusting atmosphere.

Also, the interviews lasted longer than the user interviews and provided very rich interview material.

The “user” category of interviewees changed throughout the research process. Recruiting users was easier than recruiting experts, and to a larger extent I was able to use purposeful sampling. In particular, I wanted to interview residents who recently had given platform mobility some thought. While acknowledging that meaning is created in the interview situation (Law 2004, 143–156), I did not want to “push” people into having opinions about a phenomenon they had given little thought to. Based on empirical studies, I also knew that people are more likely to make changes in their energy and mobility practices when making other changes in their life situations (e.g. Aune 2002). As a result of these considerations, I initially targeted people who had recently changed jobs or were in the process of changing jobs, or moving, or had acquired a car, as my hope was that they had thought more actively about platform mobility. Furthermore, I initially wanted to target people who could be loosely understood to belong to the middle class, as they might have had the economic means to purchase a car and might have been considering the use of car ownership in light of the presence of platform mobility.

Soon after I started conducting interviews, and based on input from my supervisors, I decided to broaden my perspective. Interviewees and people around me frequently described ride-hailing as cheap, which ignited my interest in the perspective of people for whom it was not cheap at all. As a result, I started targeting blue-collar workers. In the end, my sample included cleaning and restaurant personnel, all of whom had moved to Beijing primarily to earn money to build their life in their home province. In other words, they belonged to a group often referred to as migrant workers. Many of them rarely used dockless bicycles and ride-hailing, if at all. I was interested in how platform mobility was interwoven in the everyday lives of such people. However, on reflection, I realized that perspectives from outside or on the fringe of a mobility system could contribute just as many insights into a mobility system as those within it. Hence, I also developed an interest in barriers to platform mobility. As Morse (2007) points out, the types of knowledge necessary change according to different stages of the research process, and sampling categories may change in tandem.

The resident interviewees were recruited through my personal network, at informal social gatherings, and through my research assistants. I soon noticed that it was much easier to recruit people that I shared many characteristics with, meaning young, English-speaking,

well-traveled, and university or college-educated people. Particularly due to language barriers, I had trouble recruiting such people on my own. In this regard, I came to experience that not only the interpersonal skills of the researcher (Morse 2007) but also that of the research assistant were of great importance. After discussing sampling with one of my research assistants and explaining to her that I wanted to recruit interviewees from a broader subset of the population, she kept my project in the back of her mind when going about in her daily life. For example, after a restaurant visit, she sent a text message to tell me that a waiter had agreed to talk to me, which resulted in two interesting interviews. Her ability to gain trust and connect with people proved invaluable for the research project.

I also conducted three interviews with ground-level workers in the platform industry: one Didi driver and two food delivery personnel. I have not included these interviews in the count of interviews and Table 3 and Appendix E, as I did not use this interview material directly in the empirical analysis. I realized that it was too comprehensive an undertaking to provide a comprehensive perspective of their experiences (for further discussion on the limitations of this project, see the concluding chapter (Chapter 10). In hindsight, and based on other empirical studies (Xing 2022; Choi 2018), I believe properly capturing these workers' experiences would require ethnographic fieldwork in which one follows the informants, which would be challenging given my language skills. Nevertheless, the interviews contributed to my overall understanding of the platform industry.

4.3.1 Using social media for recruiting

WeChat is probably one of the most effective tools available to social scientists for the recruitment of research participants for projects in China today, not only because of its popularity—1.1 billion global users according to O'Neill (2019)—but also due to the nature of its use. As pointed out by Svensson (2017, 88), adding each contacts on WeChat has largely replaced name cards or, I would argue, has become a supplement. While using Facebook to contact one's professor or coworker about work-related topics might seem inappropriate in Norway, using WeChat for such purposes in China seems perfectly natural and convenient. This mix of professional and personal relationships, while arguably a reflection of Chinese social relations in a more general sense, seems an ideal source of information for the social researcher to exploit.

I used WeChat to recruit user interviewees through my network and chat groups. Contact with relevant expert interviewees was also made much easier. Using social media in that way also contributed to my understanding of how my expert interviewees were connected through professional and personal networks. Furthermore, some aspects related to social norms in general, and to WeChat in particular, can be of use to the researcher. The chance of getting a response to an email from someone that you find online is usually quite low in China. However, in the case of WeChat there is a clear social expectation to at least answer when contacted by someone connected through a mutual contact.

4.4 The interview situation

In this section, I will cover the language used in the interviews, consent, and where the interviews were conducted. This section also covers the extent to which I recorded interviews, the use of interview guides, and balancing my role as an “outsider.” I will also comment on the extent to which the interview tone was formal or casual.

Qualitative semi-structured interviews constituted the primary source of data. The questions asked in semi-structured interviews are content centered, but there is also left room for flexible questioning (Dunn 2010, 88). The interviews were conducted on a one-on-one basis in different combinations of English and Chinese. In some of the interviews, a research assistant acted as an interpreter. In other instances, expert interviewees brought a colleague, or users interviewees brought a friend to act as interpreters, who sometimes ended up being additional interviewees (interviews conducted with two interviewees are indicated in Appendix E). I conducted some interviews in English without the help of a research assistant.

Prior to the interviews, I sent a written request for participation in the research project in accordance with the standards set by the Norwegian Centre for Research Data (NSD) (see Appendix A). I provided a Chinese translation of the request to all Chinese-speaking interviewees. Sending a written request in advance gave the interviewees time to read through the terms and take time to decide whether or not to participate. While the NSD standard requires written consent, I was granted an exception from this guideline due to the research being done in an authoritarian setting, which implies that collecting and storing signed

documents might not have been advisable. I the beginning of the interview, I repeated some of the most central points relating to consent before starting to ask question; I stressed that participation for voluntary, that I would delete the recording after the project's end, and that they could withdraw from the project at any point before submission of the thesis.

The interviews were conducted in coffee shops, restaurants, at the interviewees' offices, and at Tsinghua University. I often left it open to the interviewees to suggest where to meet or I suggested a location that would be convenient for them and where they would feel comfortable and able to talk freely. I recognize the experience of Thøgersen and Heimer (2006, 14), who note that "Chinese urban people in general evidently have less time for talking to foreigners than they used to," because in my case the expert interviewees and users alike often had a tight schedule, and therefore it was particularly important to accommodate their preferences concerning time and place as much as possible. I also followed the common advice of researchers working in China to give the interviewees a small gift. The interviews lasted between 45 minutes and two hours. In some instances where I believed it would infringe anonymity, I took photos of the surroundings where the interviews were held. I experienced that this contributed to my ability to remember how I had perceived the interview situation.

All of the user interviews and over half of the expert interviews were recorded (see the overview of recorded expert interviews in Appendix E). In some instances, the interviews were not recorded, either because the interviewees asked me not to record them or because I felt it was inappropriate or would hamper the conversation. In those instances, I took notes during the interview and used the notes to write full accounts later the same day.

Some interviewees asked for a check of the excerpts and information. Such requests was based on worries that they had not expressed themselves correctly, and in other instances, it was related to sensitivity, for example, in terms of what the companies would allow them to talk about. After nearly finishing the thesis, I contacted the relevant interviewees with the possibility of looking over the material. While some followed up on this, others did not answer or wrote back that they just wanted me to share the final thesis after submission. Some interviewees requested that the questions should be sent to them in advance, and I always complied with such requests. To some extent, this produced somewhat more standardized answers, but it was essential for making the interviewee comfortable about agreeing to be interviewed.

An interview guide was used in all the interviews (see Appendix B and Appendix C for examples of interview guides). When conducting semi-structured interviews, the questions are often modified for different interviewees (Heimer 2006, 63). Therefore, the guides for the expert interviews were adapted depending on whether I talked with someone inside the sectors with observers (Appendix C). I also adapted the interview guide over time when I discovered topics that I wanted to explore in more detail. An example of how I modified the interview guide relates to the focus on gender in this thesis. During the initial preparations for the user interviews, I did not include any specific questions about safety concerning drivers. Rather, I asked more general questions about safety, which also included traffic safety and information safety. However, I realized this was an important concern during the early interviews. Therefore, I started to ask more specifically about reactions to criminal cases and the interviewees' views. I derive my understanding of ride-hailing as a gendered space (Chapter 9) from the answers to those questions. In this respect, I aimed to acknowledge the importance of being actively aware of gender relations (Berg and Lie 1995), while also avoiding reproducing gender roles in the way questions were phrased (Lagesen 2010; Anfinssen, Lagesen, and Ryghaug 2019).

During the expert interviews, I tried to balance my role as a novice (Undheim 2003) and demonstrated that I had spent time getting to know the field (Solinger 2006). On the one hand, questions that might come across as trivial or obvious can produce answers that nuance assumptions and perceptions (Korsnes 2015, 80). Also, as noted by Thunø (2006), the role as an outsider might prompt you to ask questions that might be taken for granted by a "local" or someone with intimate knowledge of a topic. For example, when asking fundamental questions about cooperation with the state and private companies, I received answers that were very different from the ones I had read before entering the field. On the other hand, in some types of research, it might be nearly impossible to ask the right questions without a certain level of background knowledge (Tjora 2010, 176). I soon realized that if I came across as too new to the field, I would be given answers that did not provide me with much new knowledge. When interviewing people with a tight schedule, it was particularly important not to spend too much time on "the basics." Especially as an outsider (Scoggins 2014), both in the tech field and as a foreigner, it was important for me to show my genuine interest and investment. I also experienced that "field work benefits from the synergy of diverse identities" (Thunø 2006, 255), in that working with Chinese research assistants provided insider and outsider perspectives.

In the user interviews, it was also important to show a basic level of knowledge, yet my role as an outsider also led interviewees to provide interesting interview material. I experienced that people's expectation of my knowledge of Chinese society was low, and this often contributed to a positive atmosphere in which I could pleasantly surprise them by using basic Chinese skills to order drinks and food in cafes or to ask simple follow-up questions. As discussed earlier in this chapter, I used my own experiences of using platform mobility to generate more interesting conversations. I also actively used prior knowledge from my MPhil project to relate to grievances, such as expressing frustration over vehicle restrictions. Asking open questions in order to avoid steering the answers is often an ideal approach in semi-structured interviews. However, many qualitative techniques are developed within a Western context and are not always adaptable to all places (Gustafsson, Blanchin, and Li 2016). While trying to relate to everyday experiences, I was nonetheless a foreigner, and my total time spent in China was limited to one and a half years (as an exchange student, shorter trips, and MPhil and PhD fieldwork). However, I think my role as an outsider might have helped in persuading interviewees to articulate cultural norms.

The tone in the expert interviews ranged from formal to casual. In one instance, the interviewee showed me slides that appeared to be a standard company presentation. In other instances, I was given strikingly similar information to official web pages, or the interviewees would answer my questions by saying that they would send an article to me. In such instances, it could be challenging to steer the conversation from less standardized answers while still remaining polite. I suspect that the way I framed my project—as open and learning-oriented—influenced such standardized answers to some extent. Still, the strategy was central to making people open to talking to me. Thus, leaving the floor open can have both advantages and drawbacks. From time to time, I was told information that I could not reproduce in my thesis, both by experts and by users. While this was certainly frustrating at times, it also gave me confidence that I was trusted.

Similar to (Sagild 2016, 9-10), I experienced that it was at times challenging to communicate to interviewees that I was interested in their opinions, experiences, and ideas, and thus that detailed factual knowledge is not a concern (Sagild 2016, 9–10). In order to ease the user interviewees' worries that they might say something “wrong,” I found it helpful to inform them that I was speaking to “experts.”

Sharing ideas with someone interested or familiar with a certain topic can motivate experts to accept an interview (Bogner, Littig, and Menz 2009, 2). Similarly, I found that some of the most fruitful interviews were those in which the interviewee was interested in my knowledge of the topic. In such instances, the interviews became more like structured conversations that provided much interesting knowledge about the actor's considerations and the challenges they faced. Therefore, I recognize Solinger (2006) experience that expressing compassionate comments about the issues at hand can release some of the most interesting interview material. While trying to strike a balance, I could not control how I was perceived, and it seemed as if the interviewees differed in their perceptions of me. As far as I could tell, I was seen as ranging from a green novice to someone to explore ideas with or as a potential partner for future collaboration.

4.5 Written sources

In addition to the interview material, I used various forms of primary and secondary written sources that informed my data collection and were subsequently used as data material. In this section, I will explain how I have used written sources and considerations relating to using written sources produced in an authoritarian context.

Before starting my fieldwork, I reviewed relevant sections of the official English translations of China's 12th Five-Year Plan (2011–2015) and 13th Five-Year Plan (2016–2020). In particular, I was interested in the emphasis in these plans on aspects such as innovation, smart systems, and technology, and how the role of private companies in bringing about economic growth changed between these plans. In addition to reading the documents, I did categorization and quantification of words (Ryghaug 2002), such as “innovation” and “smart.” I had a different focus of my thesis in mind while doing that work, but I ended up with a better understanding of platform mobility in a larger political context.

During the fieldwork and the analysis of the interview material, I accessed specific regulations and court-issued opinions on platform mobility (add reference and explanation). Unfortunately, no official English translations of these documents were available. Initially, I

used Google Translate to pinpoint the relevant sections and then asked the research assistants for translations. These translations were far from perfect, but they have certainly improved in quality in recent years. Combined with a basic understanding of Chinese grammar and relevant words and help from my research assistants, I regard this method as a way of coping, although far from perfect. When available, I also used secondary sources, such as academic and non-academic articles that analyzed the documents. There are clear limitations to using government-issued documents as they have been found to have major issues with accuracy, reliability, and representativeness (Roy, Walters, and Luk 2001, 205). Still, as I was primarily interested in how the actors understood and negotiated regulations, therefore the accuracy of at least policies and regulations has not been a major concern for my work.

Additionally, for the chapter on historical changes (Chapter 5), I used national statistics from the China Statistical Yearbook. It is important to be aware of the limitations of such sources. There are still serious doubts about the reliability of national statistics relating to economic and social indicators (Heilmann 2017). Furthermore, national statistics are still regarded by the Chinese government as a central-level tool to control information (Heilmann 2017).

Throughout the course of the research project, I aimed to read articles and recently published academic articles in order to stay up to date on changes in the platform mobility sector. This form of triangulation can contribute to making data more robust (Bowen 2009). In addition to the aforementioned limitations of government-issued documents and statistics, there are specific considerations related to using media reports and academic articles produced in an authoritarian context (Heimer 2006). The Chinese state has a firm grip on news and information (Heimer and Thøgersen 2006, 12-15). For example, the coverage of news related to environmental problems has been found to vary considerably between American and Chinese reporting on the same incident (Tilt and Qing 2010). Such considerations relate both to state-owned newspapers, such as *China Daily* (or Xinhua News Agency, often referred to as “the CCP mouthpiece”), but also to media in general. As there are no final answers on how to treat such sources, individual considerations need to be taken into account in each case. Even the academic literature does not avoid government censorship (Qiang 2015), and therefore also academic articles published by academics from mainland institutions should be subject to a critical gaze. While transport platforms certainly are not the most sensitive research subject in China, the subject touches upon topics that probably are under one form or another of censorship, such as environmental issues, questions related to information safety and Big Data, and technological progress.

Moreover, written sources from countries with a free press should not be blindly trusted. Over the years, there have been ample examples of poor, unnuanced, and at times faulty media coverage from Western media. Examples include more controversial topics such as China's Social Credit System, but also less controversial topics, including transport planning. For example, restrictions on e-bikes in Shenzhen in 2016 were portrayed as a ban in Western coverage but they may be better understood as efforts aimed at informal economic activity and vehicles not conforming to vehicle standards (Zuev 2018, 22). While there might not be a conscious political bias, I suspect it is related to articles that will generate attention and the lack of reporters on the ground, but also to a bias in thinking of Chinese culture and society. While I did not notice such apparent examples of political bias in the reporting on issues I worked with directly, it made me more cautious about also trusting Western reporting.

4.6 Ethical considerations and anonymity

In this Chapter, I have already discussed some aspects related to research ethics, including relying on the platform economy for everyday services, long-distance traveling, and consent. In the following, I will cover a few reflections beyond the aforementioned issues.

While I obtained formal consent from all the interviewees, I want to acknowledge that power relations are also present in the context of accepting interviews. From time to time during the fieldwork, I worried that interviewees felt obliged or pressured to talk to me due to social relations. While using research assistants and snowballing was an important part of recruiting interviewees, these strategies could have had implications for the degree to which interviewees felt they could decline an interview. I was particularly worried about such pressure when talking to low-skilled, migrant workers.

As already noted, in some instances, interviewees told me to leave out certain aspects of what they had said. At the same time, I have also purposefully left other parts of the interviews out of my analysis. Such considerations are based on concerns related to anonymity or particular social situations I did not regard as ethical to include.

Ethical considerations should be considered in addition to the practicalities and helpful aspects of using WeChat. Some of these considerations relate to using social media in general, while others specifically relate to using Chinese social media. China is regarded as the most sophisticated regulator of the Internet in the world (Qiang 2015). Not only are public posts subject to censorship, but also private messages are censored in real-time (O'Neill 2019). Therefore, the protection of research participants' safety should be kept in mind during private chats. Another aspect closely related to the Chinese setting is "befriending" interviewees on social media. While researchers might be careful about befriending their interviewees on social media, this is somewhat hard to avoid in China as getting into contact with people through WeChat will inevitably make them a contact. While one can adjust who has access to what on one's WeChat profile, as discussed by Svensson (2017), one might gain information about other people's professional and personal lives through what they post on their "moments."

In addition to concerns directly related to doing research in an authoritarian state, some more universal concerns should be taken into consideration when recruiting study participants through social media. In the absence of ethical guidelines for using social media for recruitment, Gelinas et al. (2017) advise researchers to "normalize" recruitment through social media and to draw parallels to similar offline situations in order to have an idea about relevant ethical considerations. In some instances, I found this approach easier than in other instances. For example, some chat groups had physical meetings, and I had an idea about the members and could ask the moderator for permission to use the groups to recruit interviewees. In other settings, the social and ethical rules seemed blurred. In general, the caution with which researchers use social media should relate to the research topic's sensitivity.

Furthermore, to the best of my abilities, I have strived to ensure the interviewees' anonymity and protect the data gathered for this research project. I gave all the interviewees pseudonyms and left out information about aspects such as where they live or their occupations. In some cases, where the interviewee was worried about the possibility of tracking the information back to them, we agreed upon a title of their occupation or a way I could refer to their work that did not infringe upon their anonymity. Further, I conducted a few interviews using WeChat video calls or Tencent Meetings (video-based conferencing solution used in China). As I was not confident that the recordings would be safely stored using the built-in recording function, I taped the digital interviews using my own recorder.

4.7 Analysis and transcription of the data

In this section, I discuss the transcription and coding process with the help of software. The section also includes how I approached outlining the empirical focus of this thesis and how I have thought about the relation between theory and empirics. I also include notes on the various arenas for data analysis.

Most of the tape-recordings of the interviews were transcribed after I had left the field. I decided I trusted the in-person interpretations from the research assistants and would not need the interview material in Chinese to be transcribed and translated again. Before starting the main task of transcription, I took time to consider whether I should transcribe the recordings myself or hire someone to do it. On the one hand, I thought that transcribing the data could provide me with a good starting point for analyzing data. On the other hand, transcription is a time-consuming process, and as I was struggling with tendinitis at the time, it was not unlikely that I would have trouble even finishing the transcriptions. The solution came in the form of purchased speech-to-text software, Dragon Professional NaturallySpeaking (by Nuance Communications) which I found gave much higher accuracy than what free online services could offer. The recorded sound files could not be transferred directly to the software due to the sound quality, background noise, and because the software is designed for a single voice (for a more detailed description, see MacLean, Meyer, and Estable 2004, 115). However, I could listen to the recordings while orally repeating, to the software, what was being said. During that process, I also checked that the transcription was correct and added notes about, for example, laughter and pauses in the recorded speech. In that manner, I was able to go through the recordings one by one and gain many of the benefits associated with transcribing data, such as a more intimate knowledge of the interview material. The use of the software almost doubled the transcription speed compared to conventional transcribing.

After completing the transcription process, I imported the text files into software adapted for qualitative research, NVivo. While reading through the transcribed interviews in NVivo, I made codes for parts of the text that were interesting and represented reoccurring themes. I tend to think about the method as “raw coding” (Fox-Wolfgramm 1997, 450). I started by organizing the interview material after descriptive codes (see Table 4). As touched on at the beginning of this chapter, I was not interested in verifying a theory, therefore I started with

descriptive codes. For example, I made codes such as “variables in transport mode”, “choice of place to live”, and “sustainability/economy business model”. In the end, large parts of the data were coded, and in some instances either double-coded or triple-coded, and with NVivo I was able to read through what I had gathered under each code (Table 4).

Using software like NVivo can also pose challenges. For several weeks I was left without access to my data due to a software update and changes in the file format, and it took me a long time and conversations with various support services to find a way to restore my coded data without having to send off my files to the NVivo support office²³.

While reading through the coded data, I wrote a rough draft of parts of the empirical material that was particularly interesting or applied to my present idea of the focus of the thesis, which provided a “raw analysis.” At that stage, my aim was to report what I had learned from the interviews, participation, and observations during my stay in Beijing. At the same time, the process should not be disguised as neutral or “innocent.” Transcribing, coding, and starting to write down the empirics are certainly also a way of enacting the social world and a form of analysis. For example, I had to make judgments about what to include, and the text was certainly not free of my own interpretation. While Software like Nvivo should ideally be used according to the methodological approach, it is neither “innocent” nor a part of how you imagine and approach data (Lewins and Silver 2014, 12).

It was only through a process of writing, rewriting, and revisiting the data material that I, with valuable input from my supervisors, started to identify theoretical lenses and concepts that I could use for structuring and discussing the material. Throughout the process of writing this thesis, I have modified, added, and discarded theoretical frameworks and concepts. In the end, the codes I used to organize the data material in NVivo looked very different from how I ended up structuring and analyzing the data material according to the more theory- and literature-informed final discussions in this thesis. Table 4 provides two examples of how I initially coded the material compared to the final structure and analysis.

²³ This unfortunate experience ended up being an example of what not to do in NTNU librarians’ presentations on Nvivo.

Table 4: Initial coding of empirical material compared to final structure and analysis

Category of interviewee	Excerpts	Initial Nvivo code	Final analysis
User	I have started to ride [dockless] bicycles more often, and I find it is quite relaxing. At the same time, it saves a little bit of money, like one yuan or two. But in the winter, I will not do that, but these days are the best days [spring- early summer] of all the year in Beijing, so I just want to enjoy the weather.	<ul style="list-style-type: none"> • transport mode <ul style="list-style-type: none"> ○ commute 	Embodied aspect of mobility
Expert	I was trying to persuade the government to propose some regulations [...]. You need some standards on what kind of bike can be allowed in the cities, how it should be maintained, and what kind of technology they should have.	<ul style="list-style-type: none"> • regulations <ul style="list-style-type: none"> ○ dockless bicycles 	government relations: predictability and influence

Meetings with my two supervisors were an integral arena for analysis. In the meetings, we discussed issues such as framing, theories, concepts, literature, text structure, and arguments. Most of our discussions centered around a chapter drafts, text sections, or raw analysis. As I was unfamiliar with STS before starting my PhD., I experience their input as necessary for situating my work within this tradition. Therefore, supervision meetings were a part of the analysis. My experience is that talking through and getting input on my work – with supervisors, colleagues, and at conferences – offered a way to think about the data material that sitting in front of a screen could not provide.

4.8 Positionality

Qualitative research starts with the “physically embodied researcher” (DeLyser et al. 2010, 5). What we learn and how we communicate such knowledge is certainly not independent of who we are and how we are perceived (Kjellgren 2006). Therefore, to the best of my abilities, I will provide some reflections on how multiple identities interacted with fieldwork and interviewing.

About doing research in China, Sæther (2006, 47) notes that: “the fieldworker’s identity is defined in relation to people who see this place as home. To do fieldwork is a conscious way of dealing with being a foreigner”. At the same time, positionality should not be understood as simply in terms a “Chinese-foreigner dichotomy” (Kjellgren 2006, 225). Non-Chinese of different nationalities and skin colors can be met with varying levels of openness and prejudices (as experienced by African communities in China (Liu 2017; Bodomo 2012). I believe that as a Caucasian foreigner, I was met with more openness than others may enjoy. Being a foreigner also had implications for the information that was shared with me; for some interviewees, this meant that they could talk more openly, while for others, it meant the opposite.

Moreover, similarly to the experiences of Korsnes (2015), I believe that being connected to a prestigious Chinese institution eased access to expert interviewees in several instances. At the same time, my position in the academic hierarchy should be understood contextually. While PhD-candidates in Norway are often positioned as colleagues, I would argue that PhD-*students* are very much exactly that in China.

Further, in some research projects, being a young woman can have implications for the extent to which you are taken seriously, which can impact data collection. However, generally, I felt that I was taken seriously. On several occasions, I experienced that my knowledge and experiences were valued. For example, the fact that I was hired as a consultant speaks to this assumption. It should be mentioned that most of the platform mobility sector interviewees were women my age. In addition, women in prestigious jobs are not uncommon in China.

In addition to how we are perceived, gender, nationality, and age is a part of how we are understood and what we see. As noted by Kjellgren (2006, 242), being a foreigner can lead us to focus on contrast rather than similarity. In other words, as researchers in a very different cultural context than our own, we must also be wary of shared human experiences rather than solely the “Chineseness” of what we observe. Furthermore, being a woman might have had implications for the choices I made during the data collection process and what experiences user interviewees shared with me. Particularly my understanding of ride-hailing as a gendered space highlights this aspect (Chapter 9). Attention to gender in qualitative research and other disciplines, such as philosophy, is, unfortunately, precisely gendered. While who

we are is interlinked with what we see (Kjellgren 2006, 241), I hope such trends can act as an invitation rather than pure criticism.

5. Reinventing the Wheel: the Bicycle and the Car in China

The role of the car and the bicycle has changed remarkably during their some 120-year history in China. Political attitudes, and practical and symbolic roles in everyday life have shifted several times. Moreover, urban planning, liberalization of the economy, and the labor market have significantly impacted urban mobility systems. By presenting and discussing these trends, this chapter addresses the first research question with an emphasis on its first part: *How have cars and bicycles been reconfigured (politically, socially, and culturally) since the establishment of the People's Republic of China, and to what extent does platform mobility shape the understanding of private car ownership?*

The historical trajectory of these transport technologies still has an impact today. For further reading of this thesis, it is important to understand what the bicycle and car have meant in China in the past and what they have come to mean today. Thus, this chapter aims to emphasize the point that we can hardly understand “new mobilities” without understanding “old mobilities” (Cresswell 2010, 29). In this regard, I aim to show how these transport technologies’ history is still relevant today. Furthermore, a significant insight in this chapter is that as transport technologies are reinvented, for example in the form of *smartification*, they might come to be associated with innovation. I argue that transport technologies seen as innovations can receive a more lenient, or even welcoming, policy approach.

The chapter is divided into two main parts (sections 5.1 and 5.2), followed by a concluding discussion (Section 5.3). The first part covers historical trends and the second looks at recent developments. I start by introducing historical changes in policy approaches, user practices, and symbolic connotations. The historical part discusses the role of the car and the bicycle, before moving to urban planning and traveling patterns. Thereafter, in the second main part of the chapter I discuss contemporary trends. The part first discusses the backlash of growing car ownership, focusing on Beijing. I discuss current policy approaches, symbolic meanings, and practices relating to cars and bicycles. The discussion also sheds light on the variety of bicycle cultures and technologies that can be seen today. The chapter ends with a concluding discussion on the repositioning of transport technologies.

The reader might notice that I have included a quite broad selection of transport technologies. This choice serves a twofold purpose. First, I aim to provide a fuller picture of Chinese streets in the past and today. Second, the examples are positioned to give more flesh to the central points of this chapter, namely how user practices, policies, political discourse, infrastructures, symbolic attributes, narratives, and urban planning are highly intertwined. In other words, together they serve to underline the point that different transport technologies and modifications are positioned differently.

The chapter contains graphs and other images to give a fuller picture of the historical changes and the contemporary situation. In addition, I include another element, perhaps one that is less conventional in academic literature, namely excerpts from one interview provided in the form of vignettes. I have purposefully not included an analysis of these in the text but rather I refer to them as if they were Figures. My aim in using this approach is to break up the text with stories from one person who grew up in Beijing. I chose this interviewee because both her life and that of her family reflect several social, political, and material changes in Beijing and, to some degree, China as a whole. For example, her parents started their careers in the military and then changed to work in the public sector. Later, in the mid-1990s, the interviewee's father started a private company. Furthermore, the family went from using a bicycle to travel to work to using a car for longer commutes. The family had access to cars earlier than most families in Beijing. Still, the interviewee's experiences related to driving shed light on the ambiguity of car ownership at a time when economic equality was still a significant societal and political ideal. I chose only to follow one person in this chapter so that the reader can more easily follow the changes reflected through one narrative. The vignettes are primarily used to put a voice to, and nuance, how changes are reflected people's lives rather than to build my argument. Thus, I primarily base this chapter on secondary sources, and I use relevant vignettes when they serve to paint a fuller picture.

5.1 A brief history of the bicycle and car in China

The history of the car and the bicycle in China dates back to the early 20th century (Barmé 2002; Notar 2016; H. (Hua) Zhang, Shaheen, and Chen 2014). They have, however, been

approached very differently by the Chinese Communist Party (CCP) and consequently had a quite different development trajectory. The bicycle was early on embraced as a highly symbolic artifact of Mao's China and had massive growth during and after the reform years. The car has gone from being an aspiration for pre-communist China, when it was morally condemned as a bourgeois commodity under communist rule to being a vital part of the development strategy and object of desire (Gerth 2016; Notar 2016). In the following discussion, I provide a historical background of the bicycle and the car in China. I focus the discussion on political approaches, social significance, and urban layout. Thereafter, I discuss contemporary approaches to solving problems that have come in the wake of automobility as well as "bordering" transport technologies.

5.1.1 Becoming "The Kingdom of bicycles"

The history the bicycle in China started in the early 20th century, when it was introduced by royalty. It was considered a luxury good at the time, and its growth in terms of numbers was very slow (H. (Hua) Zhang, Shaheen, and Chen 2014). The first symbolic association of bicycles in China was closely tied to Western fashion (Thomason 2021). After the communist revolution, the bicycle was embraced as a symbol of proletarian progress (Thomas 2018) and came to be the product that perhaps was most closely associated with Mao's China (Gerth 2016).

During the Open Door policy under Deng Xiaoping, starting in 1978, the country experienced subsequent impressive economic growth, and the bicycle became affordable for a significant segment of the population (T. Gu, Kim, and Currie 2020). The economic growth and the government's encouragement contributed to making China "The Kingdom of bicycles" (T. Gu, Kim, and Currie 2020; Norcliffe 2011). Extensive networks of cycle lanes in the major cities and the relatively compact city sizes made cycling an efficient mode of transport (T. Gu, Kim, and Currie 2020; Norcliffe 2011; H. (Hua) Zhang, Shaheen, and Chen 2014). Shorter commutes and few cars on the road contributed to making cycling a convenient choice for many (D. (Donggen) Wang and Chai 2009) (Vignette 1). Large numbers of bicycles dominated Beijing streets from the late 1970s up to the mid-1990s. Riding upright in work attire, thousands upon thousands of cyclists would flow through the city, going back and forth to work in large designated cycling lanes (Figure 7) (Thomas 2018). The bicycle was not only a transport mode but also functioned as a symbol of social status (Croll and Croll 1981).

Vignette 1. Using a bicycle for everyday needs, late 1980s, and early 1990s

When I was little, compared to now, we did not have a strong idea about which primary school was the best one. We just went to the one that was close to where we lived.

During kindergarten and the beginning of primary school, which was in the late eighties and early nineties, my dad rode a bicycle to work and took me to kindergarten on his way to work.

When we went grocery shopping, we walked or cycled. The number of bicycles would usually be the same as the number of people in the household. Bicycles were the main transportation tool.



Figure 7. “Beijing Street Viewed from Bridge” (photo: Gary Lee Todd, July 2, 1991; reproduced under Creative Commons license CC0 1.0, see <https://creativecommons.org/licenses/cc0/1.0/>)

Additionally, the government’s support was driven by the fact that bicycles were seen as an important solution to fuel shortages (H. (Hua) Zhang, Shaheen, and Chen 2014). During the early 1990s, China peaked in bicycle ownership, with bicycles exceeding the number of households in rural and urban areas (Figure 8). While the economy grew fast, most people had relatively low income, making the bicycle affordable, but the car was mainly out of reach (T. Gu, Kim, and Currie 2020; Norcliffe 2011)

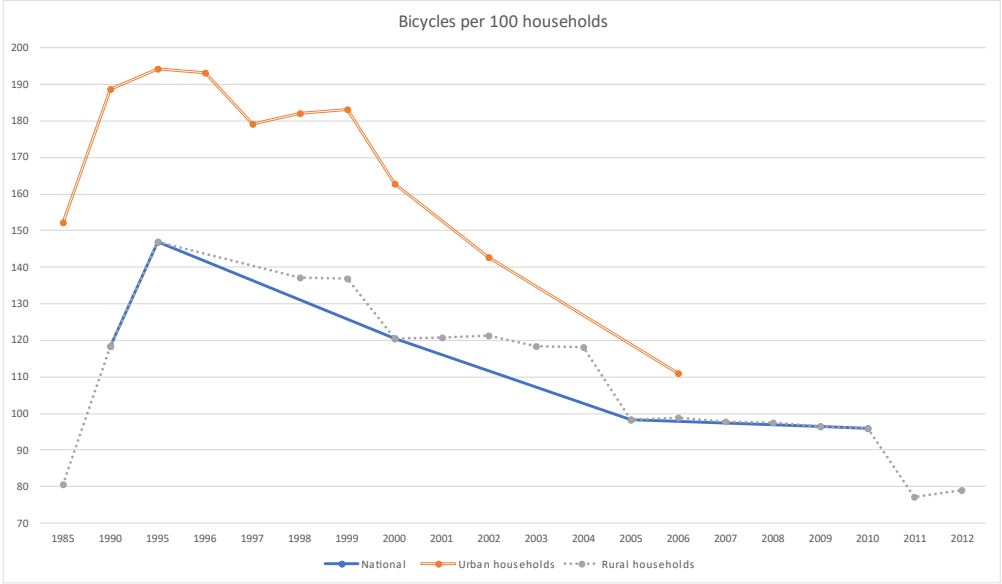


Figure 8. Number of bicycles per 100 households (source: National Bureau of Statistics of China (1999, 2000, 2008))

Also, service facilities supported the use of bicycles in everyday life. Bicycle parking facilities outside apartment buildings, workplaces, and various service facilities was often guarded (J. (Jun) Zhang 2022) (Vignette 2). While many people had the skills to do simple repairs, repair shops were readily accessible (J. (Jun) Zhang 2022).

Vignette 2. bicycle parking then and now

Because bicycles were so widely used, the infrastructure and services were different. For example, we had bicycle parking, even for shops or the cinema and these kinds of places, and they would hire someone to take care of your bicycle. I guess students didn't even have to pay and it was really cheap for other people [to use the parking facilities]. Also, outside the apartment buildings, there were bicycle parking places with a roof [late 1990s – early 2000s]. We still have that at our *xiaoqu* [residential community], but now there are far fewer and the demand for them is not the same. For example, if now you were to ask me to go somewhere, like near the old city or somewhere, I would not really know whether I could park my bicycle there. I mean, I could simply leave my bicycle at the side of the road, but there wouldn't really be a fixed parking place for bicycles.

From the establishment of the New China (1949) until the end of the 1980s, the bicycle was regarded as a sign of progress and held important symbolic meaning for the lives of the middle-classes (H. (Hua) Zhang, Shaheen, and Chen 2014). In addition, it functioned as a social signifier and became an important part of the dowry for marriage (Croll and Croll 1981). Several domestic bicycle producers supplied the Chinese market, and perhaps their most notable product was the Flying Pigeon (Feige), and that, together with the watch and the sewing machine, were designated the three “must-have” consumer goods in Chinese homes (Croll and Croll 1981; Norcliffe 2011). In other words, the bicycle was not only a key part of transportation for large parts of the population, but it had important symbolic meanings for individual users and for the country as a whole.

5.1.2 The car: bourgeoisie commodity to national champion

The car has had a somewhat different trajectory than that of the bicycle and had a very different role after the revolution of 1949. Prior to the communist regime, the car was, as in many Western countries, seen as the transport mode for the future (Notar 2016). The first car was imported to China in 1901 (Barmé 2002), and by 1912, Shanghai was home to about 1,400 motorized vehicles (Barmé 2002). In the 1920s and 1930s, cars were owned mainly by bureaucrats and the newly rich. In addition, cars were used in military parades as displays of

power. While the car certainly was a symbol of wealth, it was also associated with corruption, and their owners often met with ridicule (Barmé 2002). However, in the following years, widespread car ownership was seen as the modernist dream by the pre-communist leadership (Notar 2016).

When the CCP came to power, the car's trajectory radically shifted with political winds. Private cars were not only deemed bourgeois by the CCP but were also banned for private use (Notar 2016; J. (Jun) Zhang 2019). In other words, they were not deemed as part of the future that the Party wanted for China. At the same time, the political elite had access to cars (Notar 2016), and during the Maoist years the car became associated with corruption and the enrichment of political elites (J. (Jun) Zhang 2019).

However, political attitudes differed depending on the type of cars and the context in which they were used. For example, while perhaps not overly convincing, some political elites used jeeps to express proletarian egalitarianism (Barmé 2002). Cars were also used to display power and were even used for inspections of the Red Guards in the mid-1960s (Barmé 2002). At the same time, as car ownership was inevitably a sign of power and possibly a sign of the driver being a foreign spy, during the Cultural Revolution the Red Guard stopped vehicles and interrogated the drivers indiscriminate of their party membership status (Barmé 2002). In other words, while condemned as a consumer product, cars were very much present during public events and represented displays of economic and military power (Barmé 2002; Notar 2016). Furthermore, during the Maoist period, domestically produced vehicles were used for public transport, industry, and agriculture (Notar 2016). In other words, from the beginning, a car did not simply bear one set of symbolic meanings but rather a plurality depending on their use and type.

With the reform years in the late 1970s, the overall mission of the CCP changed from achieving a communist society to achieving rapid economic growth (Heilmann 2011, 84). With those political changes, official attitudes to the car and purchasing power increased. The Open Door policy spurred growth in bicycle ownership, and Deng Xiaoping opened up for car production for private consumption, an outcome after four years of a political "tug of war" (Notar 2016). In 1984, the purchase of private vehicles was legalized (Notar 2016) (Figure 9).



Figure 9. One year before the legalization of car for private use; typical car in Beijing in 1983 (photo: kattedbelletje, reproduced under Creative Commons license BY-NC 2.0, see <https://creativecommons.org/licenses/by-nc/2.0/>)

Like the cars before them, the first taxis also became a contested space, as they provided some of the first privileged private spaces during the reformist years (Barmé 2002). Similarly, the drivers were initially in a somewhat privileged position, as they were paid higher wages and had more freedom than workers in most jobs allocated through the state. The taxi drivers' freedom also included a larger degree of outspokenness, unlike workers in many other social groups. Also, taxi drivers were regarded by foreign journalists as valued sources of opinion during the years of Deng Xiaoping's leadership (Barmé 2002, 185).

During the 1990s, the bicycle lost much of its symbolic value as an indicator of social status, and the car took over as a desired object. In addition to the bicycle losing its symbolic value, cyclists were increasingly losing street space to motorized vehicles. During the 1990s, both middle-income and higher-income groups could afford motorbikes and e-bikes, and some could even afford cars, and in 1996 bicycle ownership began to drop rapidly (Zhang, Shaheen, and Chen 2014). Nevertheless, employees of government agencies and SOEs (state-owned enterprises), who used cars mainly for official purposes, were overrepresented among drivers (Vignette 3). In 1994, such agencies owned about 80% of passenger cars (J. (Jun) Zhang 2019). In 2006, only about 30% of 600,000 passenger cars produced domestically were sold

to private citizens (J. (Jun) Zhang 2019). Similarly, the number of cyclists decreased. While 86% of Beijingers used a bicycle to commute to work in 1986, that number fell to 18% in 2011 (Norcliffe 2011, 239) (Vignette 3).

Vignette 3: Getting access to a car through an SOE and moving to the private sector, and having time off to use the car

When my father got promoted and moved to another branch [in the public sector job], it meant that his commute was longer. The employer did not ask our family to move, but they provided a car and a driver for him to go to work. Before that, he had taken me on a bicycle to go to school. However, when he changed jobs, he started to take me and my mother in the car to school and to her workplace.

So, when my father changed to work in the private sector [around 1996], we lost access to the car that was provided by his former job in the public sector. However, his company received some investments and was able to get a company car. In that instance, there was really no one that limited the use of the private car. So, it could be used both for business and private use.

Also, at that time, there was less pressure at school and work, so we had time almost every weekend to see my grandfather, who lived outside the city.

During the mid-1990s, attitudes toward the car were ambiguous to some extent. Strong voices within the Party, and even school textbooks, deemed the Western car culture polluting, unsafe, and a waste of resources (Gerth 2016). Leading scientists urged the building a massive public transport system and one that would require less dependence on imported fuel (Gerth 2016). In the mid-1990s too, several plans and documents were released by the central authorities with the purpose of encouraging car ownership and production. With China's liberalization, a drive for domestic production of private cars was started (Gerth 2016; Notar 2016; J. (Jun)

Zhang 2019). For example, the 8th Five-Year Plan (1991–1995) included the automotive industry (Gerth 2016, 135). The plan aimed to incentivize the growth of national brands to compete in the domestic market and for export (Gerth 2016, 135). In 1991, the State Planning Commission officially promoted the production and consumption of automobiles (Notar 2016, 154–55). In 1994, the “National Vehicle Industry Policy 1994” was released and it identified the automotive industry as a future key industry for the country (T. Gu, Kim, and Currie 2020, 11). In short, there was no coherent narrative about the role of the car in the Chinese society (Vignette 4). Such ambiguity towards the car is not uncommon in communist and post-communist countries, as the car signals the owners’ success in the market economy as well as a vehicle signifying a country’s development (Hansen 2020, 2017a).

Vignette 4: Ambiguity and car ownership—being early car owners

My school was attached to a university, so most of the other parents worked there as either professors or “normal” staff. So, they did not have a lot of money and did not think about cars at that time [mid-1990s]. So, you made yourself a little bit different by being driven to school, and then I even felt a little bit shameful about it. While it is not something I could choose, and now it [owning a car] may be normal, at time I felt as though I should hide because everyone else walked to school and they didn’t have a car or even a very fancy bicycle. So, I just tried not to stand out. Thinking about it now, it seems a bit funny to me, but that was how I felt at the time.

I can also think of another thing about that period. I don’t know why, but it seemed like even without talking to each other, everyone got the same idea: so all the children that were taken to school by car were left at a certain traffic light, a short distance away from the school gate [...] So, not even my friends would know I was driven to school and I would not tell them about it.

While China was slow to embrace motorization due to political attitudes and low purchasing power in the population, it rapidly gained momentum during the 2010s. In 2012, car ownership in China was still at the same level of ownership as in America in the 1920s (Le

Vine, Wu, and Polak 2018, 128). However, after car ownership first started to grow, ownership became very rapid (Zong et al. 2020). While it took decades to reach mass ownership of cars in the Western world, mass ownership happened within a few years in China (Gerth 2016). In the 2000s, car ownership grew at an average annual rate of approximately 21% (Le Vine, Wu, and Polak 2018, 128) (Figure 10).

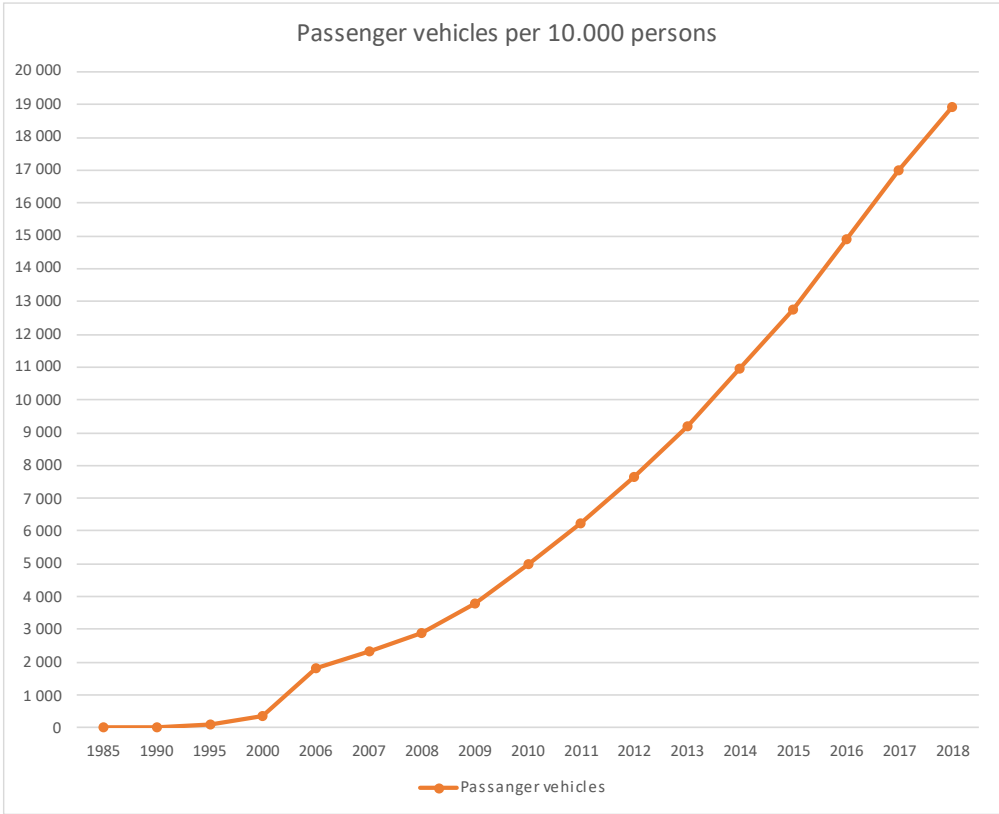


Figure 10. Ownership of private vehicles per 10,000 inhabitants from 1985 to 2018 (data source: National Bureau of Statistics of China 2021)

The present-day mass motorization of China is thus partly a product of directed efforts to stimulate the market. Gerth (2016) argues that this was not merely a result of political liberalization but rather one of conscious political actions. It can be claimed that the goal of increased car ownership and production was reached. By 2009 China was the world’s largest

market for automobiles (X. (Xiaojie) Chen and Zhao 2012, 39; Notar 2016), and by 2013 China was also the leading car producer (Yuan, Liu, and Zuo 2015). However, the magnitude of car growth in contemporary China should also be nuanced. Despite the high growth rate and total number of cars, the relative ownership of vehicles among the Chinese population is not high. For every 1,000 residents, there are 173 cars, which is lower than in other countries, such as Malaysia and Russia (McKinsey & Company 2019).

Today, the car has come to take the bicycle's role as a social signifier and its importance in marriage and middle-class life (Notar 2016; J. (Jun) Zhang 2019). Perhaps, the directed effort to make cars the engine of the Chinese economy was to some extent too successful. Today, the authorities are left grappling with its backlash. I will return to the topic of the adverse consequences of the automobility system after discussing space allocation in urban areas and changes in urban traveling distances.

5.1.3 Making space for the car: reforming Chinese streets

The first policies directed at bicycle management appeared in the mid-1990s when the government started to regard bicycles as being in conflict with motorized vehicles (H. (Hua) Zhang, Shaheen, and Chen 2014). As city authorities sought to make more room for increasing car use by either narrowing or even removing bicycle lanes, cyclists across Chinese cities were gradually forced out of using the road (Norcliffe 2011; H. (Hua) Zhang, Shaheen, and Chen 2014) (Figure 11 and Vignette 5). The goal was to limit the use of human-powered bicycles, and both national and some local governments issued policies aimed at decreasing the amount of cycling (H. (Hua) Zhang, Shaheen, and Chen 2014).

At the national level, the State Bureau of Technical Supervision and the Ministry of Construction jointly released the *Standard of Urban Road Traffic* in 1996 (H. (Hua) Zhang, Shaheen, and Chen 2014, 319). The document was the first and only one from the central government that gave explicit direction on cycling and contributed to a reduction in bicycle use (H. (Hua) Zhang, Shaheen, and Chen 2014, 324). According to the document, bicycles were the main reason behind conflicts between users of motorized transport and users of non-motorized transport. Instead, longer bicycle trips were intended to be replaced by public transport, and the share of cycling as a mode of transport was to be similar to or lower than that of public transport (T. Gu, Kim, and Currie 2020; H. (Hua) Zhang, Shaheen, and Chen 2014). The document (*Standard of Urban Road Traffic*) was not entirely negative towards

cyclists, since it encouraged the use of separate lanes for motorized and non-motorized transport (H. (Hua) Zhang, Shaheen, and Chen 2014).

Partly as a result of the discouraging policies, one-third of China's bicycle ownership disappeared between 1995 and 2001. Nevertheless, since it was decreasing from a very high level, it remained the dominant travel mode in most cities until 2000 (T. Gu, Kim, and Currie 2020). In sum, discouraging government policies toward bicycles have played an important part in the reduction in bicycle use in China (Frame, Ardila-Gomez, and Chen 2017; H. (Hua) Zhang, Shaheen, and Chen 2014).



Figure 11. Crowded street toward the turn of the century. (Photo: otzberg, September 29, 1999; reproduced under Creative Commons license BY-NC-SA 2.0, see <https://creativecommons.org/licenses/by-nc-sa/2.0/>)

Vignette 5: Building down bicycle lanes and making space for cars

The road next to our *xiaoqu* used to have two lanes for cars and two for bikes, but now, because there are so many cars, they turned the bicycle lanes into parking spaces. This must have been around the early 2000s. So, after that, if I was cycling, I would cycle between the moving cars and the parked cars, and there weren't any barriers to protect me.

As in many urban areas across the world, different modes of transport will often conflict in dense urban spaces. Zuev (2018) argues that in a Chinese context, the expansion of major roads has happened at the expense of dedicated bicycle lanes. The norm in China is to have a lane for all two-wheelers rather than a designated human-powered cycle lane. As these lanes have grown increasingly narrow, this has become an increasing challenge for cyclists who share the space with motorized two-wheeled vehicles (T. Gu, Kim, and Currie 2020; Zuev 2018). In addition, an increasing number of cars blocking cycle lanes poses a safety hazard to cyclists (C. Zhao et al. 2018), as shown in Figure 12. H. (Hua) Zhang Shaheen, and Chen (2014) classified selected cities into high, medium, and low bicycle use after 2000, and Beijing was classified as having a medium level of bicycle use (30.3%) in 2005. They note that differences between Chinese cities in bicycle use in that period can be ascribed to factors such as topography, the public transport system, and the ownership rate for private motorized vehicles.



Figure 12. Car parked in cycle lane, Chaoyan District, June, Beijing, 2019.

5.1.4 Infrastructure and urban layout

The process of adapting cities for cars accelerated with the liberalization of China. However, already after the revolution of 1949 “Beijing was transformed into a highway city” (Barmé 2002, 178), after the city had remained very much car-free for many years. The expansion of the highways happened at the expense of the old city walls and old urban centers (Notar 2015), and the ring roads circling Beijing today date back to that early development (Barmé 2002). The orientation towards a car-based city was first a product of Japanese occupation, but later, during communist times, it was due to inspiration from the Soviet Union (Barmé 2002). In other words, the groundwork for the car-based infrastructure was already in place by the 1970s, before the pressure of mass motorization (Barmé 2002). However, starting in 1957 in Beijing, alongside broad roads for cars, designated bicycle lanes were constructed (Norcliffe and Gao 2018).

The liberalization of China from the 1980s did not only directly incentivize car travel but it also impacted Chinese cities’ spatial layout. Private firms, including developers, were given more leeway to operate, and power was increasingly decentralized from the state (P. Zhao 2010). Competition between local governments to attract investments and developers has further relaxed local governments’ control over private firms (P. Zhao, Lü, and Woltjer 2009). The result has been a growing urban fringe, such as in cities of Beijing and Guangzhou (Y. Huang 2004; P. Zhao 2010).

Increasing commuting distances have been reinforced by the phasing out of the work unit (*danwei*) compounds since the reform of the 1980s (D. (Donggen) Wang and Chai 2009) and later the housing reform of 1998 (Ta et al. 2017). Under the planned economy, housing, employment, and welfare goods were allocated through the *danwei* system (Ta et al. 2017). Before the period of reform, the system was used to create smaller societies within the cities and thus co-location of production and consumption, which required shorter traveling (D. (Donggen) Wang and Chai 2009) (Vignette 6). As Chinese cities have expanded, and living and working conditions are no longer controlled through the work units of the Maoist period, everyday travel covers longer distances (J. (Jun) Zhang 2019).

Vignette 6. Land use mix and the social relations of the danwei compounds

When my parents still worked in the public sector, their work was organized through the *danwei* system. The *danwei* you worked in would provide accommodation. So, you would not own the apartment, but you would get a place to live, and almost everything you needed for your everyday life would be close by.

Usually, you wouldn't travel very far. The shops, homes, schools, and workplaces were all in close proximity to each other. If you needed to travel far, you would go by bus.

So, everyone in the same building would work together in the same *danwei*, and they knew each other. Also, everyone earned more or less the same amount. So, at that time, somehow, you feel that people's relationships were quite close. After work, our parents would play board games or do other activities together, and the kids would play in the garden. Everyone knew everyone. Now, so many people in the city don't even know the people who live in the apartment next door to them.

Once my dad went [to work] in the private sector [around 1996] and we had to move from that apartment [allocated through the *danwei*]. After a while, my parents got a loan, and then we moved into our own apartment.

Since around the turn of the century, commuting from the suburbs to the city has become much more common (Ta et al. 2017). There is also a low degree of land use mix in the urban fringes, meaning that people often have to travel far to get to work, for recreation, and for shopping (P. Zhao 2010). The findings made by Ta et al. (2017, 571) suggest that “the job-housing relationship in Chinese cities is changing from job-housing balance ensured by the *danwei* to job-housing separation by market forces in recent years.” The diminishing role of the *danwei* system is therefore likely to contribute to congestion and become a challenge to the sustainability of Chinese cities (D. (Donggen) Wang and Chai 2009). In this respect, node-based cities, where housing, jobs, and facilities are co-located in hubs, are often deemed a more sustainable option (Bertolini & Le Clercq, 2003).

Notar (2016, 158) understands the demolition of urban centers in Chinese cities as part of a process to make way for cars. For example, the narrow lanes of the Beijing Hutongs²⁴ do not make good roads for driving cars. While similar processes have happened in other parts of the world, the rate and speed with which this has happened is unprecedented in urban China (Notar 2016, 158).

Thus far, this chapter has covered historical trends to provide the background to the situation of the car and bicycle in China today. Before the concluding discussion (section 5.3), I discuss contemporary trends. In the next section (5.2.), I briefly introduce the spatial layout of Beijing’s transport system and some of the most severe consequences of automobility in China.

5.2 Contemporary approaches to urban mobility and spatial planning

The rapid growth in Beijing’s economy and population in recent decades has left clear marks on today’s urban fabric. Industrial buildings, agricultural land, and some parts with traditional housing have been replaced by apartment and commercial complexes (Y. Huang 2004). While large parts of Beijing consist of residential areas, there are also more distinct areas, such as the Central Business District, the Olympic Park, the university area of Wudaokou, Zhongguancun Software Park, and the shopping areas of Sanlitun. The sprawl of the city and

²⁴ The *hutongs* are alleys formed by rows of traditional courtyard residences.

the segregation of different districts therefore reinforce the need for increasing traveling distances that the dissolution of the *danwei* system created. To a large extent, the answer has been to increase the capacity of the transport system and build a network of ring roads (Y. Huang 2004)

The city's road network is based on a hierarchical system (Y. Huang 2004). The historical and residential areas of the old city are surrounded by the inner ring road, which is the first of seven outer ring roads. Between the ring roads are main highways in a grid pattern, with smaller roads leading to residential communities (*xiaoqu*). As the grid pattern corresponds to the cardinal directions (north, south, east, and west), it is not surprising that Beijingers often use these directions for orientation instead of left and right. There is an underground metro system with a similar pattern made up of 27 metro lines (as of June, 2023).

The bicycles that used to stream into Chinese cities have largely been replaced by cars today. What used to be “The Kingdom of Bicycles” has become “The Kingdom of Cars” (Zuev 2018). It seems that no matter how wide roads are built, gridlock is inevitable. In Beijing, traffic is often sluggish on the eight-lanes ring roads (Figure 13) and on the small residential roads. Thus, commuting to work appears to involve a continued struggle for space.



Figure 13. The 3rd Ring Road at noon in Haidian District, Beijing, May 2019

Mass motorization in China has not happened without costs to the environment, public health, and perhaps even the economy. In addition, the car culture's emergence will inevitably have geopolitical ramifications in terms of fuel, extraction of materials, and global climate negotiations. The environmental effects in terms of CO₂ and airborne air pollution are apparent at both national level and local level. In 2019, the transport sector in China accounted for 7% of greenhouse gas emissions and was the fastest growing sector in terms of emissions (Erbach and Jochheim 2022, 3). From 2010 to 2020, the annual growth rate of transport energy consumption was 9.7%, and the annual growth rate of CO₂ emissions was 9% (B. (Biying) Yu, Li, and Zue 2020). Particulate matter (PM), also known as particle pollution, particularly the smallest particles (PM_{2.5}), seeps through face masks and causes people's health to deteriorate. Furthermore, vehicles' air conditioning system contributes to emissions (Teng, Su, and Wang 2019). In sum, vehicles are a leading contributor to the increase in climate gases, including CO₂ (Teng, Su, and Wang 2019).

The transport sector's contribution to emissions continues to grow in line with private vehicle ownership. Roughly 50% of CO₂ emissions in China are from the industrial sector, 40% are from the power sector, and 8% are from the transport sector (Ministry of Ecology and Environment of the People's Republic of China 2018). Although the power sector and industry account for much more, roughly 40% and 50% respectively (Ministry of Ecology and Environment of the People's Republic of China 2018), than the transport sector, they have managed to make considerable cuts in recent years (Heggelund 2021; Stensdal 2014). As industrial production and coal plants are being located away from the major cities, the transport sector's contribution to airborne pollution is growing. In large and medium-sized cities in China, vehicle emissions are the main source of air pollution (Jin, Andersson, and Zhang 2016; Peng et al. 2015).

Undoubtedly, air pollution has major and well-documented effects on public health (Lai, Tsang, and Wong 2013; F. (Fuzhong) Li et al. 2015). Today, air pollution is one of the greatest health hazards in China, and is associated with deaths related to lung cancer and other respiratory diseases (P. Xu, Chen, and Ye 2013). The Global Burden of Disease Study showed that from only one year of exposure to ambient air pollution, 1.2 million people died prematurely (S. S. Lim et al. 2012). While ambient air pollution is first and foremost a public

health concern, the economic costs are considerable and estimated to be somewhere between 1% and 7% of the country's GDP (Jin, Andersson, and Zhang 2016, 2). Automobility further has adverse consequences for public health in terms of obesity and traffic accidents (Notar 2015).

In recent years, ideas about bicycles and cars have changed. The bicycle is no longer a public obstruction but, to a larger degree, a sign of modernity and environmentalism (Thomason 2021). The car's ties to modernity, at least in the case of the combustion engine car, are ambiguous. Also, how the urban transport systems should be planned and designed has changed. In the major cities, car use and ownership are subject to strict restrictions (Koh 2004; J. (Jun) Li, Wu, and Zhang 2015), ambitious goals are set for public transport development (Sun and Zacharias 2020), and the bicycle has been welcomed back, as partly evident from restored infrastructure (C. Zhao et al. 2018).

In the following two sections (5.2.1. and 5.2.2), I discuss approaches to two-wheeled and four-wheeled forms of transport. The discussion covers approaches to the car, including New Energy Vehicles (NEVs), as well as symbolic associations of car ownership in contemporary China. Thereafter, I discuss how bicycle-friendly policy has regained support, and the diverse uses and meanings of bicycles in recent years. I also include an introduction to public shared-bicycles and the ambiguous role of the e-bike.

5.2.1 New car cultures and new technologies

Today, policy approaches to private car ownership in China can hardly be understood as simply supportive or discouraging. The world's biggest automobile manufacturer and consumer is also home to some of the strictest car ownership regulations and use in the world. Therefore, while the car industry is promoted as an important engine in China's economic development (Zuev 2018, 31), the authorities, particularly at the local level, are also dealing with the adverse consequences. There are great differences in approaches between urban and rural areas, between cities, and between types of cars, namely NEVs and those that are powered by fossil fuels. While car ownership is highly restricted in major cities such as Guangzhou, Shanghai, and Beijing, this does not apply to people in medium and smaller cities or to rural areas. A more thorough discussion is presented in Chapter 7. While the growth rates in sales have recently taken a short dip, they are likely to continue to increase in the future (McKinsey & Company 2019). In other words, car culture is well established.

The symbolic aspects are, for example, evident in the choice of car brands. The selection of car brands and models has increased from a handful of domestic options during the 1980s, and 1990s to a great variety of domestic and imported cars, including a number of high-status brands (McKinsey & Company 2019). Furthermore, a wide variety of car cultures has emerged in China, as the country has become accessible to larger strata of the population (Notar 2016; J. (Jun) Zhang 2019).

NEVs have emerged as a solution to environmental, public health, and energy security while being able to keep the economic benefits of car production. This strategy is certainly not restricted to a Chinese context. Globally, electric vehicles (EVs) are widely envisioned as a way of decarbonizing the mobility system without causing major changes in mobility practices, as well as a way of fueling the economy and creating jobs in the manufacturing sector (Capuder et al. 2020; Sovacool, Bergman, et al. 2020).

In China, NEVs have been subject to directed government efforts to incentivize production in general and sales in particular (B. Lin and Wu 2018). In the 12th Five-Year Plan (2011–2015) EVs and NEVs are highlighted as one of seven strategic industries to be promoted (Aamodt and Stensdal 2017, 120). Various tools, such as demonstration projects, advanced research, exemption from purchase restrictions, tax credits, city development, and transport planning policies have been implemented to increase NEV adoption (H. Du et al. 2018; J. (Jiuyu) Du and Ouyang 2017). In the future, the government's efforts to increase the share of NEVs are likely to continue. Authorities have announced that by 2035 all sales of new vehicles must be of NEVs (Fleming 2020). China is now the world's largest market for EVs (in absolute numbers) and continues to have a high growth rate in domestic consumption (B. Lin and Wu 2018). In 2019, EVs market share was 4.9% compared to 2.6% globally (IEA 2020).

The NEV's contribution to sustainable development is not straightforward. China's energy production is primarily coal-based. Particularly in northern China, including Beijing, driving an EV might be equal to driving an internal combustion engine car in terms of CO₂ output (Huo et al. 2010; F. (Fangyi) Li et al. 2019). In terms of local pollution, such as PM_{2.5}, which is particularly harmful to public health, NEVs' contribution is much clearer. Since local transport policy in large Chinese cities focuses more on local air pollution than on national CO₂ output (Valler 2017), NEVs could represent a positive contribution. The picture is further complicated by NEVs' contribution to traffic congestion. More cars on the roads often means more engines idling, including those of vehicles powered by fossil fuels. Given

the density of Chinese cities, private NEVs can hardly be a solution for the masses in the big cities, as the authorities are well aware. Instead, public transport and increasing electrification of public transport is intended to continue to account for the bulk of urban mobility (Central Committee of the Communist Party of China 2015). Therefore, NEVs should not be understood as the main solution to how people should move around in cities, but rather, as one part of a multimode transport system.

The larger four or five-seater EV, which is most common in Western countries, is common in the biggest cities in China. However, the smaller, low-speed' electric vehicle (LSEV) is more common in rural areas and often does not require the user to have a driving license (Zuev, Tyfield, and Urry 2018). While being important for everyday life in many provinces, LSEVs do not receive the same kind of political support and incentives as EVs (Urry 2018).

5.2.2 Reviving bicycle-friendly policies and bicycle cultures in modern China

During the turn of the century, some local governments began to see cycling as the solution to increasing congestion, which led to a varied policy approach across the country (H. (Hua) Zhang, Shaheen, and Chen 2014). A local policy shift in Shanghai marked a significant change. For the first time, bicycles were defined as a *complement* to public transport rather than competition (H. (Hua) Zhang, Shaheen, and Chen 2014). Beijing was fast to follow suit. In 2004, the “Master Urban Plan of Beijing 2004–2020” stated that cycling and walking were an integral part of the city’s transport system’s future (T. Gu, Kim, and Currie 2020, 12). Beijing and Shanghai, in particular, have been at the forefront in China in creating bicycle-friendly policies (T. Gu, Kim, and Currie 2020). While the cycle lanes had long been shrinking, in 2012 both Beijing and Shanghai initiated a number of reconstruction projects to increase the width of human-powered bicycle lanes (T. Gu, Kim, and Currie 2020, 12). It should be noted that these policy changes came mainly from the local level in the big cities and was probably related to the fact that it is mainly at the city level that the adverse effects of mass car ownership could truly be felt. Over time, these attitudes seemed to spread to the central level. In 2012, national guidelines to encourage slow modes of transport were released, and they set goals for cycling for local governments as a political performance indicator²⁵ (T. Gu, Kim, and Currie 2020). Furthermore, a couple of years later, in 2014, the guidelines were further specified, and more detailed design and planning specifications were provided to local

²⁵ In the Chinese political system, political performance indicators are institutionalized, and they are aimed at generating incentives and deciding promotions among cadres (Tsai and Dean 2014).

governments to enable them to provide a slow-transport plan by 2015 (T. Gu, Kim, and Currie 2020).

Additionally, monumental and highly symbolic pieces of bicycle infrastructure have been built in urban areas. A prime example is the three-lane cycle lane that opened in Beijing in 2019. The cycle lane spans about 6 km and connects the residential area of Huilongguan with Shangdi District and the Zhongguancun Software Park (often referred to as “China’s Silicon Valley”). The cycle lane is a highway in the sense that it is secluded and that some parts of it are elevated. Furthermore, it intersects with metro stations and has multiple entry points. The direction of travel (indicated by arrows) in the middle lane can be changed to allow increased cycling capacity according to the time of the day (Figure 14). Guards at each end of the highway make sure that the bicycle highway is only accessible to pedal-driven bicycles; e-bikes are not permitted to use the lane. The construction was done in record time, even by Chinese standards, and the fast decision-making around the piece of infrastructure should be understood in the context of the shift in political signals around pedal-driven bicycles. The fact that the cycle lane is partly elevated and thus does not take space away from cars can also help to explain the fast decision-making by the Beijing municipality (Valler 2019).



Figure 14. The three-lane cycle highway in Changping District, Beijing, at a quiet time of day in July, 2019.

Although the bicycle enjoys support from the government today, the situation for cyclists appears quite difficult. Existing policies can be described as “supportive“ in every field (T. Gu, Kim, and Currie 2020, 12), and attempts have been made to reinforce bicycle infrastructure, for example by constructing a network of bicycle-only lanes in Beijing’s *hutongs* and residential areas (Norcliffe 2011). Still, undoing the years of discouraging policies is not easily done. Cyclists are also facing other challenges today that were not as pressing 40–50 years ago. Some of the major barriers to cycling are growing cities, urban sprawl, longer commutes combined with air pollution, reduced space for cycling, lack of parking space for bicycles, bicycle theft, and cycle lanes occupied by cars (T. Gu, Kim, and Currie 2020, 5; Norcliffe and Gao 2018, 89).

It is apparent that the human-powered bicycle also has undergone considerably reinvention in China. Bicycle technology and culture now have great variety in styles and shapes (Figure 15). In contemporary China, cycling is not simply a transport tool for the masses but also a form of exercise and has ties to ecological modernization (S. Zhao et al. 2021). Therefore, we might rather talk about bicycle cultures (i.e., in the plural form). In the 1980s, bicycles were Chinese-produced, sturdy, and ridden while sitting upright. While Chinese-produced bicycles such as the Flying Pigeon (Feige) and the Phoenix (Fenghuang), and Forever (Yongjiu) remain popular, they are mostly used by older people (Gerth 2016). Also, while the bicycles associated with the days of the bicycle kingdom are still being ridden through Chinese cities, they are outrun by young riders in sports attire hanging over dropped handlebars (for an account of emerging cycling cultures in urban China, see Thomason 2021). Colorful single-speed and racing bicycles can be found on university campuses, outside coffee shops, and in the Beijing Hutongs, side by side with working three-wheeled vehicles operated by street cleaners. What is striking about the bicycles in Chinese cities is the great variety in use and types, not only of pedal-driven bicycles but also of motorized varieties, including e-bike, pedelecs, light e-bikes, and mopeds.



Figure 15. Different types of bicycles. Left: pedal-driven and e-bikes parked near a metro station in Beijing, 2019. Right: Single-speed bicycles at Sun Yat-Sen University, Guangzhou, June 2016

I now turn to discuss two forms of bicycles: bicycles for shared use by the public, and e-bikes. The former is included to provide background to the history of the type of organization of access to bicycles upon which dockless bicycles have been built, whereas the latter is included to shed light on a form of mobility that has gained less attention in media and the academic literature, despite being a widespread form of quite sustainable mobility. While, for example, low-speed electric vehicles (LSEVs) have similarly gained less attention, I have chosen to focus on two-wheeled bicycles due to their importance for urban mobility and as a transport technology with interesting symbolic connotations.

Public bicycle-sharing

Public bicycle-sharing is a favored way among for decision-makers in urban areas around the world to demonstrate a commitment to environmentalism and facilitate easy access to cycling (Bergström 2017; Nikolaeva et al. 2021; Shaheen, Guzman, and Zhang 2012). As in many other countries, several cities and even districts in China (Figure 16) have actively promoted public bicycle-sharing services provided by state-owned corporations or outsourced to companies (Shaheen et al. 2011).

The first docked bicycle-sharing program was launched in China in Beijing in 2005. It was operated on a for-profit basis, yet it did not grow very rapidly or gain much attention, and it ended in 2011 due to bankruptcy (H. (Hua) Zhang, Shaheen, and Chen 2014). The program

launched in Hangzhou in 2008 grew notably larger (H. (Hua) Zhang, Shaheen, and Chen 2014) and was the first government-supported program in the country (T. Gu, Kim, and Currie 2020). Today, this program is one of the most well-developed in China (Shaheen, Guzman, and Zhang 2012). At the end of February 2012, twelve Chinese cities had implemented public bicycle-sharing programs involving a total of 180,500 bicycles (H. (Hua) Zhang, Shaheen, and Chen 2014). The following years saw rapid growth, and in 2015, the number of programs totaled 215, making China home to the world's leading bicycle-sharing market (T. Gu, Kim, and Currie 2020).

While public bicycle-sharing has gained support in urban China, it has also been troubled by challenges in terms of governance. In the later 2000s 2009, the Beijing Municipal Government published the *Action Plan of Beijing Municipality for a People-Oriented, High-Tech Urban Communications System (2009–2015)* (H. (Hua) Zhang, Shaheen, and Chen 2014). According to the plan, Beijing would have 1,000 public bicycle-sharing and bicycle-rental stations, with at least 50,000 bicycles available near major rail stations and bus terminals by the end of 2012 (H. (Hua) Zhang, Shaheen, and Chen 2014, 324). However, support for public bicycle-sharing might have been at the cost of other bicycle-oriented policies. J. Yang et al. (2015) even argue that by 2015, planners focused on creating public bicycle-sharing programs over bicycle infrastructure development. Despite this prioritization, public bicycle-sharing has also met considerable challenges related to “land provision, financial sustainability, pricing, and public transportation integration” (H. (Hua) Zhang, Shaheen, and Chen 2014, 329).



Figure 16. Neighborhood-specific public shared bicycles next to the elevated bicycle lane in Huilongguan, Changping District, Beijing, July 2019

In recent years, public bicycle-sharing has faced new challenges in the form of dockless bicycles. Funding for public bicycle-sharing has been impacted in a negative way by the massive increase in dockless bicycle sharing. In many urban areas in China, dockless bicycles have largely replaced public bicycle-sharing (Y. (Yuan) Li, Zhu, and Guo 2019).

The e-bike: a place in a modern mobility system?

Compared with the bicycle and the car, other modes of transport, such as the tricycle, mini EVs, and the e-bike, have received far less academic attention but nonetheless have been highly important for urban and rural mobility systems (; X. Lin, Wells, and Sovacool 2018; Norcliffe 2011; Zuev 2018). I have included a short discussion of the e-bike for two main reasons: (1) it is a central part of China’s urban (and rural) transport system, and (2) it is an example of a transport mode that is deemed not part of the future of transport in urban China.

Therefore, it appears an interesting example to contrast with platform mobility and new energy vehicles (NEVs)²⁶ in a discussion of narratives relating to mobility.

The e-bikes (electric two-wheeled bicycles)²⁷ is a key part of the Chinese mobility system. In China, cars are still outnumbered by e-bikes (Zuev 2018, 31). The popularity of e-bikes has been aided by their being affordable, widely available, and as they are a flexible and fast way of getting around. However, this development has happened by and large without the political leadership's support (Zuev 2018). Rather, the e-bike has gained much political support in China, and the blooming EV industry, spearheaded by companies such as BYD, has received considerable global attention. Still, "on the ground," the e-bike remains a central mode of transportation (Zuev 2018).

The e-bike is in a grey zone regarding government support and its place in the city. It is a source of constant annoyance to drivers on the roads, pedestrians on sidewalks, and cyclists in the cycle lane, while legally, it is supposed to drive in the bicycle – or rather— the lane for two-wheelers. Perhaps, as a result of the e-bikes being on roads, sidewalks, and the two-wheeler lane, driving behavior is often associated with a sense of lack of manners and education, referred to as *suzhi*²⁸ in China. Zuev (2018) argues that it is "the particular ways of riding and bending the traffic rules that define a 'low *suzhi*' of the user, and not the mere fact of e-bike ownership" (Zuev 2018, 44). This reputation may be somewhat undeserved, as deaths among car occupants constituted 48% of all fatal accidents between 2006 and 2016 (L. Wang et al. 2019), and number of e-bikes still outnumbers the number of cars (Zuev 2018). While the e-bike's reputation may be changing, the e-bike is still largely seen as a "lower-class technology" (Zuev 2018, 47). As such, e-bikes do not belong to the high-tech, modernizing, orderly China, and restrictions against them can partly be understood through what they have come to mean symbolically (Zuev 2018). Due to regulatory pressure and their symbolic connotations, the future seems uncertain for e-bikes in China's urban mobility system.

²⁶ In a Chinese context, NEV is often used as an umbrella term that includes four-wheeled vehicles that are either entirely powered by electricity or partly powered by electricity and other fuel sources such as hydrogen (i.e., hybrids).

²⁷ The e-bike is often divided into three categories: the partly pedal-driven pedelec (bicycle style), e-scooters (moped style), and a mix of the two (Y. Huang 2004). In this thesis, where not specified, e-bikes refer to the latter two categories and 'pedelecs' are referred to as such.

²⁸ *Suzhi* is often translated to 'quality', but it does not exist a precise English translation (Kipnis 2006). Kipnis (2006, 295) notes that "this word has become central to PRC dynamics of governance. Reference to *suzhi* justifies social and political hierarchies of all sorts".

The e-bike has a place in the sharing economy as a vehicle used for express delivery of take-away food. Furthermore, it seems that the e-bike is not completely locked into its image as low-class technology. Particularly, through the company Niu, the e-bike has been promoted to young urbanites with higher education. In marketing its products as “a little bit Vespa, and a little bit Tesla” and as having several “smart” features, Niu is trying to define itself as different from typical e-bike manufacturers (Zuev 2018). Therefore, the “Niu” e-bike represents how reinterpretation of shared representations of transport technology.

5.3 Concluding remarks: mobility and the politics of innovation

The mass adoption of a particular mode of transport, whether bicycle or car, is not only a result of economic development within a country. Rather, such mobility systems are deeply engraved within culture and are supported by aspects such as industry linkages, infrastructure, policy, and symbolic connotations (e.g., Sheller 2004; Urry 2000). As Gerth (2016) points out, although most Western countries have made cars a part of their economic development, China did not necessarily have to do the same. For example, countries such as Denmark, Germany, and the Netherlands, have maintained or re-made cycling as a mainstream mode of transport (Pucher and Buehler 2008; C. Zhao et al. 2018). Understanding the political considerations that contributed to bicycle culture and, later, to car culture in China thus aids the understanding of how these processes could have happened otherwise.

Throughout their some 120-year-long history in China, the car and the bicycle have undergone major changes in symbolic meanings, regulations, and everyday practices. As a consequence, both dockless bicycle and ride-hailing companies have very different historical narratives. The dockless bicycle companies can look back to the time of “The Kingdom of Bicycles”—a transport system that was abandoned because, among other reasons, it contributed to gridlock, pollution, and premature deaths—and claim that they are a part of the road back to the heydays (Mobike 2017). The ride-hailing companies lack a similar narrative power in terms of sustainability. Therefore, it is interesting to note that, for example, Didi, positions itself as a *mobility company* and has also been claiming to solve other social issues, such as unemployment (Didi Chuxing 2017). The two cases of platform mobility covered in

this thesis concern bicycles and cars and have very different connotations in terms of sustainability. However, the platform mobility companies have in common their linkages to innovation. In the following discussion, I focus on how technologies, narratives about innovation, urban planning, and policy are co-produced.

Transport technologies are subject to considerable changes over time, as different social groups identify problems and stake out solutions to them (Pinch and Bijker 1984). As Zuev (2018) demonstrates with the example of e-bikes in China, a mobility tool can change in terms of the cultural, symbolic, and social meanings ascribed to them, both by generations and by the introduction of new models and types of vehicles. Similarly, Thomason (2021) shows how the bicycle, once again, has gained connotations of modernity. In the case of the car, some of its linkages to pollution are shed through electrification.

Economic differences within the Chinese population have increased since economic reforms were initiated under Deng Xiaoping (serving between 1978 and 1989) (Teets and Hasmath 2020). In addition to income inequality, variations in lifestyles, types of occupations, urban-rural divides imply greater variety in life in China today than before the reform years. In line with these changes, cars, bicycles, and e-bikes are no longer coherent cultural signifiers. Therefore, the meaning of transport technologies does not only change as time passes and socio-material conditions change, but also increasing diversification in meanings and uses has occurred in recent years. Compared with elsewhere in the world, the trend is particularly clearly evident in China, a country that has experienced rapid economic, political, and social changes. While a similar point may be made for other parts of the world, I argue that the Chinese cases make this particularly clear.

Further, meanings and uses of transport technologies are altered or recreated as new technologies are added to existing technologies. Today, this often takes the form of *smartification*. Processes of technological and symbolic recreation certainly occurred prior to digital technologies (Pinch and Bijker 1984). Therefore, the addition of apps relating to the use of cars and bicycles can be seen as “just another” modification in a long line of alterations that have been made to existing technologies, which have transformed old technologies into novelties. However, the digitalization of transport technologies seems to have contributed to a quite different narrative than the narratives for other modifications, especially the case of innovation.

The modifications are hardly “innocent.” As discussed within STS, technologies can certainly act as participants in politics (e.g., Marres 2016) and policy. Transport technologies undergoing hybridization and the stamp of “innovation” has consequences for how technologies are treated through policy instruments. In short, technologies positioned as a part of the future may also be subject to less stringent regulations.

Modifications to transport technology and policy approaches are co-shaped; political documents and policies aim to generate innovation in the transport sector (Ibold and Li 2019; Central Committee of the Communist Party of China 2015), and innovations in transport technologies impact policymakers’ approaches. Transport policies can be regarded as reflections of what means of transport are regarded as civilized, environmentally friendly, and an appropriate fit for a city, but policymakers may also try to influence such attitudes towards various transport technologies through campaigns, allocation of space, and restrictions. The examples of the e-bikes and the NEV underpin this aspect.

Throughout history, transport technologies, such as the car and the bicycle, have been subject to various encouraging and discouraging policy approaches and have either “bloomed or withered.” However, popularity cannot simply be understood as resulting from policies. In some instances, initial attempts to boost transport technology industries have failed (Skjølsvold and Ryghaug 2020), while in other scenarios, the popularity of transport technologies seems to have grown out of people’s everyday needs and more independently of what the state may wish for the mobility system (Zuev 2018). Such recognition is important when considering platform mobility. The launch of platform mobility in China was hardly a product of a top-down political initiative. However, it cannot be understood independently from how economic liberalization (and thus, for example, venture capital) and political signals from the state were aimed at citizens in order to spur innovations.

The next chapter delves into the case of regulatory approaches to platform mobility and further develops the argument that policy approaches and smartification are intertwined. Chapter 6 also illustrates how actors beyond the state are active in shaping policy approaches. I will also show that platform mobility companies seek to cement their role in Chinese society by participating in broader development within the transport sector.

6. Regulating the Unruly and Negotiating Policy Space

In the previous chapter, I discuss political, social, and symbolic changes in transport technologies in China. Chapter 5 ends with a concluding discussion on how we can understand the relationship between innovations in the transport sector and regulatory approaches. I argue that transport technologies that the state regard as a part of the future may receive a more lenient policy framework. This understanding is important for understanding the regulatory approach to platform mobility. At the same time, in this chapter, I show how platform mobility actors also are actors in the policy process.

With the launch of platform mobility, new constellations of technologies and actors are brought together. In its wake, we also see new relations between users and providers, public bodies and companies, and labor relations. The relationship between the companies and the state is of particular importance. As a relatively new sector, the regulatory framework for platform mobility has been under development in recent years, and regulators are trying to balance concerns about, for example, the protection of other industries, data privacy, innovation policy, and public obstruction. How the government designs and enforces regulations plays a crucial role in the companies' future, and therefore the companies seek to influence policy outcomes in their favor. Hence, establishing relations with governing bodies and individual officials may enhance their influence on regulations and enforcement.

Furthermore, platform mobility companies have great resources in terms of access to transport data, technology, and expertise, which they can utilize in their relation to the state. In recent years, some of these companies have expanded from providing on-demand urban mobility to also acting as consultants and developers in smart city and intelligent transport system (ITS) projects in collaboration with state actors. Thus, how relations between the companies and regulators are negotiated and the role of data, technology, and expertise in those relations is central to understanding platform mobility in contemporary China. At the same time, the companies are also relying on tried-and-true methods of establishing such relations. In this chapter, I discuss both “new” and “old” ways of ensuring good government relations. It is on this background I ask the following research question, RQ 2: *How do platform mobility companies negotiate regulatory processes, and to what extent are they actors in state-led technological ambitions?*

I specify the second research question of this thesis into the following three sub-questions; *How have the operations of dockless bicycles and ride-hailing been increasingly formalized through regulations? How can we understand the importance of good government relations? What strategies are platform mobility companies applying to ensure information flow and policy influence, and what is the role of technological projects and data in these strategies?*

While chapters 7-9 focus on user perspectives and everyday practices, this chapter examines relations between private actors and regulatory bodies. I focus on policies, as these are the most central way that platform mobility is governed. The aim of the chapter is to contribute to debates on policy experimentation at the local level in China, particularly in the technology field. Drawing on an article by Noesselt (2020) and my interview material, I argue that the ITS pilots that platform mobility initiates and engages in should be understood as scattered and largely unsynchronized, contrary to hierarchical guided policy experimentation (Heilmann 2011, 2017). Furthermore, the chapter investigates how platform mobility as a sociotechnical system grows and becomes a part of another sociotechnical system, namely smart city and ITS projects. In short, the chapter draws on transition studies perspectives and literature on Chinese policymaking and state-market relations. In addition, this chapter contributes to the empirical studies of the relation between platform mobility companies and the state in China (Chan and Kwok 2022; Noesselt 2020; Spinney and Lin 2018).

As discussed in the methodology chapter (Chapter 4), the empirical material in the following discussion is primarily based on interviews with representatives of platform mobility companies, NGO staff, consultants, legal experts, and researchers (see Appendix E and Section 4.3). Some of the researchers (including an urban planner) had previously worked for or collaborated with actors in the state apparatus. The lack of direct perspectives from authorities beyond plans and issued regulations is certainly a shortcoming of the analysis. Nevertheless, it speaks to the realities and challenges of doing fieldwork in China (Heimer and Thøgersen 2006) and the difficulty of access to local authorities, which seems to have increased in recent years (Åsnes Sagild 2022). Accordingly, the chapter should be understood as an empirically guided discussion of examples of strategies that platform mobility companies utilize to improve government relations and achieve influence over policy, rather than as providing an exhaustive overview.

The chapter is organized as follows; I start by covering central issues of the regulatory framework for dockless bicycles and ride-hailing in section 6.1. Thereafter, in Section 6.2, I

discuss the importance of the companies maintaining good government relations in order for them to have a say in the outcome of regulations. Thereafter I move to strategies to enhance such relations in section 6.3. The first two strategies are companies positioning themselves as responsible companies and hiring staff from the local government. Furthermore, I cover more specific strategies for the platform mobility sector relating to access to data and technological capabilities. Section 6.3, also underscore the importance of the municipal level in determining where collaborations between public and private actors are established. After the concluding section (6.4), I have included an epilogue on the striking policy shift of 2021 and how we can understand the chapter’s findings in light of these developments.

6.1 From regulatory vacuum to formalization

The first years in which platform mobility became prevalent in urban China have often been characterized as either a regulatory vacuum (H. (Huiqin) Jiang and Wang 2020), a “wait and see” approach (Reddick, Zheng, and Liu 2020), or as legal gray zone (Noesselt 2020).²⁹ Two years passed from the first dockless bicycle hit the streets (Ibold, Nedopil, and Retzer 2018) to the time when the first regulations were released. After Didi Dache³⁰ was founded in 2012, it took four years until ride-hailing was formally legalized in 2016. The official stance from the Ministry of Transport was that it took time before the challenges and opportunities of the ride-hailing sector became fully evident (People’s Daily Overseas Edition 2016). H. (Huiqin) Jiang and Wang (2020) point out that the government’s late official response to ride-hailing can at least in part be explained by the fact that the official position on the sharing economy had to be established first. The official position came with the “Guiding Opinions on

²⁹ It should be noted that there was a crack-down on the ride-hailing industry in 2014–2015, which complicates the idea of a complete *laissez-fair* approach. During a somewhat short period, ride-hailing was prohibited in some cities, including as Beijing, Shenyang, Nanjing, and Guangzhou, through separate circulars from the municipal level (H. (Huiqin) Jiang and Wang 2020). The official reasoning was related to safety aspects. In particular, reasoning related to the fact that drivers could be distracted by their phones when looking for passengers (Kuo 2015). In addition, Beijing police argued that ride-hailing apps could be discriminatory against the older population that did not use smartphones and against other people trying to hail taxis on the streets (Kuo 2015). While this was not a part of the official statement, the reasoning might also have been related to protecting the taxi industry (Kuo 2015). However, the crackdown in 2014–2015 was aimed not only at ride-hailing drivers but also at taxi drivers who used apps to find passengers (Kuo 2015).

³⁰ Didi Dache later (in 2015) merged with Kuaidi Dache and became Didi Chuxing.

Promoting the Development of the Sharing Economy”³¹ issued in 2017 (H. (Huiqin) Jiang and Wang 2020, 95). In other words, the companies first had to be understood and made into governable objects (Mukhtar-Landgren and Paulsson 2021). In this section I provide an overview of the most important national measures relating to ride-hailing and dockless bicycles.

Several of the expressions of policy directions and regulations have come in the form of “guiding opinions.” In China, “guiding opinions” in general, including the one discussed here, are formulated to match political directions expressed in speeches, action plans, and five-year plans (General Office of the State Council of the People’s Republic of China 2016; Ministry of Transport of the People’s Republic of China 2017c). Ferrante (2020, 689) points out that “In the Chinese legal order, this type of opinion is binding on the lower courts and the [Supreme People’s Court] SPC.” Furthermore, in the case of platform mobility, “guiding opinions” delegate responsibility between relevant parties including various government bodies, the platform industry, and users (General Office of the State Council of the People’s Republic of China 2016; Ministry of Transport of the People’s Republic of China 2017c). The “guiding opinions” have important consequences for the companies, at the same time they are, at least officially, open to the public and thus open to change (J. (Juan) Du and Xu 2016; Tao 2017).

However, “guiding opinions” are often limited, as they do not specify how measures should be carried out in practice (Thomson Reuters n.d.). In some cases, for “guiding opinions” in general, it is not even practically possible to implement the stated measures (Kinkel and Hurst 2015). Therefore, while the measures mentioned in “guiding opinions” are incorporated in important documents for tracing the overall position on the platform mobility industry and an outline of regulatory frames, they clarify regulatory specifics to a lesser extent. Thus, as stated in both the “guiding opinions” and the other national policy documents relating to the platform mobility sector, it is up to city-level governments to formulate appropriate regulations for local conditions (General Office of the State Council of the People’s Republic of China 2016; Ministry of Transport of the People’s Republic of China 2016a, 2017c; Xue, Chung, and Yu 2018).

³¹ In Chinese: 关于促进共享经济发展的指导意见 (*Guanyu cujin gongxiang jingji fazhan de zhidao yijian*), English translation based on (H. (Huiqin) Jiang and Wang 2020)

The intention behind the national guidelines on platform mobility was to give instructions on the overall framework and leave it to municipalities to implement them according to local conditions (Horwitz 2017b; Ministry of Transport of the People’s Republic of China 2017c, 2022b; Xue, Chung, and Yu 2018). As a result, there are considerable variations across China in how they are implemented and how strict they are (Y. (Yanwei) Li and Ma 2019; Reddick, Zheng, and Liu 2020). Generally, in larger cities, including Beijing, there are stricter requirements for both ride-hailing and dockless bicycles than elsewhere in China (Noesselt 2020; Reddick, Zheng, and Liu 2020).

In order to provide an understanding of the policy climate in which the platform mobility companies operate, I discuss the most relevant measures in the following. The discussion in the chapter as a whole, further highlights aspects of the local regulations that are of particular importance to the companies. In the following two sub-sections, I also outline how we can understand pressures to regulate platform mobility. Thus, in the following, I approach the first sub-question; *How have the operations of dockless bicycles and ride-hailing been increasingly formalized through regulations?*

6.1.1 Regulating ride-hailing

In the following, I provide an overview of the regulations that guide the operations of ride-hailing companies. Some of the most important aims of the national regulations are to ensure passenger safety, decrease dissatisfaction in the traditional taxi sector, control who can serve as drivers, what types of vehicles can be used for ride-hailing, and establish evaluation systems for operators and drivers.

Over the years, ride-hailing has become increasingly formalized, with several regulations guiding its operations (see Table 5). Several factors cumulated and intensified the pressure for regulation of the service. Due to some of the ride-hailing companies’ size and capital, they have been able to subsidize prices and give extra rewards to drivers, which has had adverse consequences for the traditional taxi service (Xinhua 2016c). Furthermore, there was a need to clarify the responsibility of the ride-hailing sector, particularly in light of criminal cases (Xinhua 2016c) (see Chapter 9). Noesselt (2020) points out that the importance of “social harmony” and reducing precarious working conditions, which could threaten to result

in new forms of class struggles, was important driving factor for regulating the ride-hailing sector.

Table 5. Regulations of ride-hailing, national level, 2016–2019

Implemented	Issuer	Regulation	Relevant measures and changes	Overall goal
July 2016	General Office of the State Council of the People’s Republic of China (GOSC)	Opinion on Deepening the Reform to Promote Healthy Development of the Taxi Industry*	Legalization of ride-hailing and definition of a taxi service; requirement for drivers to have three years of driving experience and no criminal record; flexibility in work contracts; defined as “high quality service”	Ensure passenger safety, coordinate innovation development, establish evaluation systems for operators and drivers, coordinate between stakeholders, ensure local autonomy and fair competition
November 2016	Ministry of Transport of the People’s Republic of China**	Interim Measures for the Administration of Online Taxi Booking Business Operations and Services***	Operation license required for companies and drivers; maximum age of cars (8 years), maximum km driven (600,000 km); employment contracts for drivers as main rule, but still some flexibility permitted; local government given authority guide prices; companies have carrier responsibility	Further clarification of the above-described regulation: set specific rules for all parties and give local governments authority to determine requirements for licenses; address unfair competition and price subsidies
December 2019	Ministry of Transport of the People’s Republic of China****	Resolution on the Revision of the “Provisional Regulations of the Online Taxi-Hailing Service Sector”	Drivers required to have an operation license and permit (including insurance); increased cost of licenses; national credit system for companies and drivers	Amendment of the interim measures to improve safety yet further; meet diverse travel needs; protect passengers’ rights

* Sources: Yin and Zhou (2017), Xue, Chung, and Yu (2018), J.-W. Hu and Creutzig 2022, and General Office of the State Council of the People’s Republic of China (2016)

** Together with Ministry of Industry and Information Technology, Ministry of Public Security (MPS), Ministry of Commerce (MOFCOM), State Administration for Industry and Commerce (SAIC), General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ), and Cyberspace Administration of China (CAC)

*** Sources: Z. Huang (2016), Ministry of Transport of the People's Republic of China (2016a, 2016b); People's Daily Overseas Edition (2016); Xinhua (2016a); Xinhuanet (2016), Yin and Zhou (2017), Xue, Chung, and Yu (2018), H. (Huiqin) Jiang and Wang (2020), J.-W. Hu and Creutzig (2022)

**** Together with MIIT, MPS, MOFCOM, SAIC, and CAC

***** Sources: Lawinforchina (2019), Noesselt (2020), Peking University (2019)

Today, the regulatory framework for ride-hailing represents one of the most comprehensive and developed regulatory approaches in China compared to that in other “sharing industries,” including the dockless bicycles industry (H. (Huiqin) Jiang and Wang 2020). In the end, the regulatory framework for ride-hailing was similar to that of traditional taxi companies, although with slightly more leeway and flexibility for ride-hailing. Since 2016, ride-hailing has been officially defined as a taxi service (General Office of the State Council of the People's Republic of China 2016)³². H. (Huiqin) Jiang and Wang (2020, 100–101) argue that this approach to the ride-hailing industry allows the government to rely on tried-and-trusted regulatory measures.

While there is a comprehensive regulatory framework in place, the regulations are not always strictly enforced or overheld by the companies (van Wyk 2022; X. Qiu 2019). For example, while the state mandates operational licenses, by 2018 Didi had obtained licenses in a minority of the cities in which it operated (J. Y. Chen and Qiu 2019).

6.1.2 Regulating dockless bicycles

In this section I discuss national and municipal regulations for dockless bicycles. As my interview material for this chapter also covers dockless pedelecs, I also include regulations relating to their operations. The regulations include aspects such as user deposits, how long bicycles can be in operation, number control of bicycles, and ensuring orderly parking and bicycle quality. The following also includes a discussion on the official, and surprisingly supportive, stance on dockless bicycles.

³² In some areas of policy implementation the taxi administration offices are responsible for overseeing the ride-hailing sector (Ministry of Transport of the People's Republic of China 2022b).

In addition to ride-hailing there has been considerable public pressure to regulate dockless bicycles. Much of this pressure stems from the level of public obstruction caused by oversupply and disorderly parking of bicycles (Reddick, Zheng, and Liu 2020). In contrast to ride-hailing, several cities implemented local regulations before the national “guiding opinions” documents were released. During the spring of 2017, several major Chinese cities, including Chengdu, Shanghai, Shenzhen, and Beijing, started to regulate different aspects of dockless bicycle companies’ operations (T. Gu, Kim, and Currie 2019). In May 2017, The Ministry of Transport of the People’s Republic of China released the “Guidance on Encouraging and Regulating the Development of Internet Bike Rental (Guiding Opinion)”³³ (Ministry of Transport of the People’s Republic of China 2017b)³⁴, which was not only aimed at regulating the sector but also at fostering better collaborations between the private and the public sector (Cao et al. 2022). Although municipalities sometimes release urban transport policies independently of national policies (X. (Xiaojie) Chen and Zhao 2012; Valler 2017), in this case there might have been coordination between the national level and city level government since the policies were released during the same spring of 2017.

The “Guiding Opinion” document is quite vaguely formulated and primarily delegates responsibility to cities to implement regulations. Still, as a document from a number of ministries, it reads as a guide to the official stance on dockless bicycles, which is, perhaps to a surprising extent, overall positive (Ministry of Transport of the People’s Republic of China 2017b). S. Zhao et al. (2021) even describe the government’s attitude to dockless bicycles as a form of “over-optimism.”

The “Guiding Opinion” document states that dockless bicycles have contributed positively to last-mile solutions, the alleviation of traffic congestion, a sustainable transport system, and economic development. At the same time, it also points to major problems in the dockless bicycle sector and puts forward measures for these issues. The measures include technical parking management (in practice, often meaning geofencing), increased bicycle quality, accident insurance for riders, improved deposit management, and implementation of punishment for disorderly parking in the form of fines or credits. Interestingly, the “Guiding Opinion” also makes clear the need for better bicycle infrastructure, including bicycle lanes, parking, and connectivity with public transport. In other words, the presence of dockless

³³ In Chinese: 鼓励和规范互联网 租赁自行车发展的指导意见 (*Guanyu guli he guifan fazhan hulianwang zulin zixingche de zhidao yijian*) Translation based on Cao, Prior, and Moutou (2021).

³⁴ Both *xiang danche* (shared bikes) and *wang zulin zixingche* (online rental bikes) are covered in official documents (Ministry of Transport of the People’s Republic of China 2017a, 2017b).

bicycles is seen as a positive contribution to a sustainable transport system but also as one that should also work as an impetus for further infrastructural development to support cycling.

Furthermore, the national guidelines (“Guidance on Encouraging and Regulating the Development of Internet Bike Rental (Guiding Opinion)”) mandate cities to implement mechanisms that control the number of bicycles adjusted to local conditions (Ministry of Transport of the People’s Republic of China 2017b). In Beijing, this has meant that, in practice, volume control of bicycles; each company has been given a quota on how many bicycles they can have on the streets (Beijing Municipal Commission of Transport 2017; Mao et al. 2021). As municipalities have had some leeway to form their own regulations, some cities have taken a stricter approach than others. For example, in April 2019, the southern city of Guangzhou implemented a bidding system for licenses to operate and only gave three companies licenses (Reddick, Zheng, and Liu 2020). In other words, while regulations relating to dockless bicycles in Beijing are quite strict, some cities have taken an even stricter approach.

The Beijing-specific regulations also include the maximum life span of the dockless bicycles set at three years (Beijing Municipal Commission of Transport 2017; Mao et al. 2021). From an environmental perspective, it would make sense to set a minimum standard and thereby indirectly regulate bicycle quality (F. Zheng et al. 2019). However, it appears that the maximum life span regulation was motivated by safety concerns after several accidents caused by malfunctioning bicycles, rather than environmental concerns.

The position towards electric dockless bicycles varies considerably across China. The 2017 “Guiding Opinion” document clearly discourages their development (Ministry of Transport of the People’s Republic of China 2017b), and transportation administration in large cities, including Beijing, Tianjin, and Hangzhou, has been negative due to safety concerns (Y. Yang 2019). At the same time, in the summer of 2019, electric dockless bicycles were widespread in Tianjin. In smaller cities with less developed public transportation networks, transport administration has been more lenient. To a large extent, this corresponds to differences in policy approaches between more developed and less economically developed cities regarding privately owned e-bikes (as discussed in Chapter 5, section 5.2.2). In addition to the “Guiding Opinion” document, in 2019, the technical guidelines on dockless e-bikes were updated to improve traffic and fire safety. The guidelines mandated a pedal function and limited their top speed to 25 km per hour (Y. Yang 2019).

In 2019, several government agencies jointly issued guidelines targeting the issue of deposits not being refunded. The guidelines were aimed at all platform mobility services and recommended that if deposits were necessary, they had to be administered through deposit accounts to prevent misuse of funds (Ministry of Transport of the People's Republic of China 2019; Jiang et al. 2020). In addition, several local regulations have been implemented and updated in Beijing (*Global Times* 2018a). For example, the scoring system gives guidance on how many bicycles each company can supply (Beijing Municipal Commission of Transportation 2022). Additionally, technical specifications have been updated. An important aim of these regulations is to make sure that the inbuilt technology of the bicycles allows for parking management, data collection, and rebalancing of bicycles (Ministry of Transport of the People's Republic of China 2022a; Beijing Municipal Commission of Transport 2017)

So far, I have outlined the regulatory environment for dockless bicycles and ride-hailing. The following discussion will center around the interviews I conducted during my fieldwork in 2019. However, before addressing the research question (*How do platform mobility companies negotiate regulatory processes, and to what extent are they actors in state-led technological ambitions?*), understanding why platform mobility companies' relation to governmental bodies is central to their operation is needed.

6.2 The importance of government relations: predictability and influence

For many companies operating in China, ensuring good government relations is important to aid interaction with different levels of government and administer appropriate responses to regulatory changes (Y.-R. R.(Yi-Ru Regina) Chen 2007). Therefore, medium and big companies often have government relations departments (Neerhut 2016), and platform mobility companies are no exception (Hu Muyuan³⁵). Neerhut (2016) points out that government relations may even be more important in sectors where regulators struggle to keep up with technological change. Therefore, government relations are undoubtedly essential for platform mobility companies, given that they are working with new constellations of technology. The importance of such relations is further reinforced by the

³⁵ Interviewee, anonymized, 2019, see Appendix E.

fact that these companies operate in public spaces, as pointed out by Hu Muyuan, with specific reference to dockless bicycles. On this background, I address the second sub-question; *How can we understand the importance of good government relations?*

Good government relations can aid communication and possibly even give the companies a better chance of having a say in shaping future regulations. Xia Zimeng told me that Mobike had actively tried to push for a clearer regulatory framework before the regulations were issued. She had worked for Mobike since the early days of the company and in the beginning of her time in Mobike she had worked in government relations. She had been pushing for a clearer framework as early as in 2016:

I was trying to persuade the government to propose some regulations [...] You need some standards on what kind of bicycle can be allowed in the cities, how it should be maintained, and what kind of technology it should have, such as GPS and smart locks [...] It is not good if it is all about producing the highest number of bicycles. However, they [the government] argued that we need more time to study the sector before making regulations.

Thus, according to Xia Zimeng's understanding, the lack of knowledge was, therefore, an important reason for the local government to postpone drafting of regulations (see Cao et al. 2022 for similar findings from Nanjing). Xia further argued that the lack of regulations enabled dockless bicycle companies to produce large numbers of low-quality bicycles, which led to overcrowding streets and in the so-called "bicycle graveyards" (e.g., B. Haas 2017). As the overall logic of the dockless bicycle sector is centered on quantity and, thus, easy access for users (R. Chen 2019; Ibold, Nedopil, and Retzer 2018). While other companies interpreted the lack of regulations as a commercial opportunity (Cao et al. 2022), Xia positioned Mobike's strategy as being in contrast to this approach. She argued that the company's approach was to produce fewer but higher quality bicycles. The regulatory framework she had been arguing for in 2016 would perhaps have been a good fit for Mobike's business model or the company's aspirations for the market.

The lack of regulations on bicycle standards prior to 2017 also posed challenges for a much smaller company offering pedelecs. Ding Liying, a representative of this (anonymized) company, said that some years after the company had been rolling out the bicycles, the requirements for bicycle standards suddenly changed. The changes entailed that the company had to recall and modify its fleet. She explained that they were relatively lucky as the new pedelec standards allowed for heavier and faster bicycles than theirs, meaning that the bicycles were mainly within the regulations.

Stricter regulations were not only good news, neither for Mobike. During the fieldwork in 2019, certain areas, such as historical areas and shopping hubs, were off-limits for dockless bicycle parking. By 2021, a more comprehensive form of geofencing was implemented in Beijing, meaning all bicycles had to be parked within a restricted area. When interviewing Xia in 2019, she regarded the less restrictive form of geofencing as a positive contribution to the city. However, she saw the more restrictive form as problematic for Mobike and other dockless bicycle companies. She understood it to be beyond dockless bicycle companies' technical abilities due to the need for GPS technology with a high degree of accuracy. In addition, Xia characterized geofencing as “invisible docked bicycles,” and thus harmful to their business model as it was a step back in terms of the convenience that dockless bicycles provided. Therefore, at least in Mobike's case, it seemed vital for the company to be involved early in conversations with the government about regulations in order to attempt to steer policy directions.

In short, these two, Mobike and the anonymized one, companies sought predictability through clarification of regulatory requirements. It should be noted, that calls for clearer governance of “smart mobility” beyond China often come from the platform mobility companies (and the consultancy sector). Such calls are often based on the argument that regulations need to be changed to enable smartification of the transport sector (Mukhtar-Landgren and Paulsson 2021).

However, for ride-hailing companies, such calls were not as pronounced. Rather, the lack of industry-specific regulations might have been an advantage. With the regulatory changes of 2016, a number of new requirements for cars, drivers, licensing, and even prices were issued (H. (Huiqin) Jiang and Wang 2020; Yin and Zhou 2017), which inevitably changed the conditions for their operations. At the same time, when discussing the sustainability of Didi, representative Huang Jiayi expressed the need for clearer guidance from the government on sustainability. She noted that if there were a carbon market, it would make more sense for Didi to enhance the sustainability of its operations, since Didi was after all a company and thus driven by profit. While ride-hailing companies seemed to thrive better in the regulatory vacuum compared to dockless bicycle-sharing companies, they were all the while dependent on predictability and information, which could be achieved by a steady flow of communication between the private and the public sector.

In terms of ensuring good government relations, the local level is of particular importance. While national guidelines on ride-hailing have been issued, the local interpretations of them are often the most central for day-to-day operations. For example, the decision to define ride-hailing as a “high-quality service” at the national level (Ministry of Transport of the People’s Republic of China 2016a, 2022b) was, according to legal expert Pang Zhenya, made in order to consolidate the wish to both protect the traditional taxi industry and at the same time keep the ride-hailing industry. Therefore, aiming at defining them as within a different market segment seems to have been the answer from the regulators’ position. The practice of “market moving,” which involves actively steering prices to meet policy goals, is common in China (Weber and Qi 2022). The state’s decision to define the ride-hailing market vis-à-vis the traditional taxi industry can thus be understood as a way of balancing the market.

In the Chinese context, the movement of political signals and regulations from the central to the local level is not a straightforward process (Lieberthal 1992; Tyfield et al. 2015). Local interpretations, negotiations, and adaptations are common. In the case of prices on ride-hailing, leeway at the local level was not only possible but stated intention in the national regulation (Ministry of Transport of the People’s Republic of China 2016a). Pang Zhenya noted.

It is important to note that it [ride-hailing] is defined as a ‘high quality service’, so they do not explicitly say anything about the price level of the service, but many local governments interpret this as ‘high price’ and set standards of the car, but the companies disagree with this.

As result, regulations on consumer prices on ride-hailing services were something that Didi had particularly sought to change, though without results. So, while the government might wish to encourage the presence of “new and innovative“ companies, its support for Didi is somewhat restricted by the importance of protecting the taxi industry and restricting the flow of people into Beijing.

Another regulation with local characteristics that had much impact on the ride-hailing sector was regulating who could serve as drivers and what vehicles could be used. Initially, in order to drive for a ride-hailing company legally in Beijing, one must hold a local *hukou* (household registration document) (for further explanation of the Hukou-system see Ebbers 2019; Z. (Zhuoni) Zhang and Treiman 2013). The local government seeks to reduce the number of people that come to Beijing to make a living as ride-hailing drivers. For migrant workers who wish to go to the city to earn a living as a ride-hailing driver, obtaining a local

hukou is not only difficult but more or less out of the question (on the difficulty of getting a *hukou*, see for example, Hong 2013)³⁶. Sun Qingying, who had worked with data visualization for Didi, pointed out that the restrictions were motivated both by concerns related to air pollution, which is particularly pressing in Beijing, and by the need to protect the local taxi industry. In combination with the above-mentioned restrictions on driving cars without a Beijing license³⁷ plate, this further restricts non-Beijingers ability to work in the city. However, there is not always compliance with the restrictions on holding a local *hukou* and a locally registered car. During government inspections, Didi was fined a number of times for failure to comply with the restrictions (X. Qiu 2019).

To summarize, increased formalization was desired for some companies as it could ensure predictability and avoid unforeseen economic loss. However, for other companies, and Didi in particular, increased specifications through regulatory frameworks were expected to hamper their operations and, therefore, something they tried to avoid. In addition, communication with municipal policy makers is important for platform mobility companies in general, as regulations are specified at a local level. Therefore local interpretations of nationally formulated policy directions are central to daily operations. In the following, I will explore the condition of government relations based on perspectives from interviewees inside and outside the platform mobility companies.

6.2.1 The state of government relations

Based on interviews during my fieldwork in 2019, I argue that both ride-hailing and dockless bicycle-sharing companies maintained good relations with various local governments, as well as with national bodies. In addition to more informal networks, as pointed out by legal experts Pang Zhenya and Dong Zhenzhen, ride-hailing companies are included in formal procedures in regulatory processes (X. Wu 2017). Xia Zimeng, from Mobike, told me that both government officials and representatives from relevant companies attended meetings

³⁶ As the Beijing government only offers about 5,000—7,000 local *hukous* each year, having a master's degree, a good job, and an apartment is by no means a guarantee that a *houkou* can be obtained (Ebbbers 2019, 193–194).

³⁷ To offset the effect of the regulatory requirements on a locally registered car in Beijing, Didi has different schemes for renting and leasing cars (interviewee Huang Jiayi).

and open discussions prior to issuing new regulations³⁸. She hoped that by having these discussions the company could avoid “very strict or unreasonable regulation.”

However, such relations might even become overly tight. The two NGO representatives, Meng Qishan and Xia Jing, indicated that the relationship between Didi and the Ministry of Transport was even too close. Somewhat jokingly, Meng Qishan exclaimed “Didi is too spoiled by the government!” Meng Qishan suggested that the tight bond between Didi and the government might have contributed to the near-monopolistic role held by Didi.

The description of a welcoming attitude to ride-hailing companies was nuanced by the legal experts. They understood the policy environment to be mainly supportive of other e-commerce industries and argued that the policy environment was not that welcoming for the ride-hailing sector—a perspective that might make sense in light of the legal issues on which they had been working. It was clear that the researchers, Di Ziren and Liang Jixing, and the NGO representatives, Meng Qishan and Xia Zimeng, had a different understanding of the situation.

Undoubtedly, good cooperation might also be in the interest of the government. In a policy document from 2019, “Outline for Building China’s Strength in Transport,” a stated goal is the development of shared transport and Mobility-as-a-Service (Ibold and Li 2019) (see Chapter 2, Section 2.5 for further discussion). In addition, Xia Jing mentioned that the government was targeting better connectivity between non-motorized transport and the existing public transport systems, and added the following:

So, I do not think actually it [the government] cares which company operates dockless bicycle sharing, but it really wants them [the companies] to have good communication with the government in terms of planning, especially parking and also issues with oversupply.

Certainly, it is in the interest of both local and national authorities to have a close dialog with the companies to reduce the side effects of an uncontrolled dockless bicycle market. Therefore, it seems quite apparent that it is in the best interest of both parties to have a good collaboration.

In short, while the platform mobility companies certainly are subject to regulations that they disagreed with, the companies covered in this thesis appeared to have steady communication

³⁸ Official meetings had also been held prior to the release of ride-hailing regulations (Ministry of Transport of the People’s Republic of China 2015), and after their launch (Cao et al. 2022), although the extent to which opinions from the sector have been taken into consideration is somewhat unclear.

channels linked to the government at various levels at the time when I did my fieldwork. Lastly, good government relations can aid access to transport data from local governments, which in turn can be used for development projects for ride-hailing companies. I return to this aspect in the following discussion.

6.3 Strategies

The platform mobility companies employ different strategies to ensure good government relations. To some extent, these strategies resemble those of other Chinese companies, and companies worldwide for that matter. For example, hiring staff from the public sector and trying to come across as responsible companies might be recognized beyond the Chinese context. At the same time, some strategies are particular to this sector and highly place-specific regarding their access to data, expertise, and technology. As platform mobility companies have grown, they have also expanded their operations to include a variety of intelligent transport projects in cooperation with local government and assisting in planning processes. Hence, intelligent transport projects have had the dual benefit of ensuring good relations and functioning as technology development projects for platform mobility companies. Thus, the companies can expand their portfolios and provide services to local governments simultaneously. In the following discussion, I aim to shed light on the third sub-question; *What strategies are platform mobility companies applying to ensure information flow and policy influence, and what is the role of technological projects and data in these strategies?* Based on the expert interviews, I categorized the strategies into five main groups: (1) positioning as socially responsible companies, (2) recruiting employees from the local government, (3) sharing data and assisting in planning processes, (4) aligning with China's high-tech ambitions, and (5) Identifying "friendly environments."

6.3.1 Positioning as socially responsible companies

It is important for the companies to signal to the authorities and to society at large that they can make a positive contribution to society. Ding Liying, a representative from the anonymous pedelec company, explained that the company wanted to show the government that it could operate reasonably, follow the regulations, and provide value to the public. She

also stressed the importance of the company always letting the government know what it was doing and asking for permission before, for example, producing more pedelecs. As the transport administrators in Beijing had a lukewarm approach to privately owned e-bikes pedelecs, it was particularly important for the pedelec company not to cross the line with the government. Although it could sometimes be difficult for Chinese companies to know where the line actually is (Breznitz and Murphree 2011; L. Tang, Murphree, and Breznitz 2016), letting the authorities know its plans was of key importance.

Cao Yifan, a former employee of Didi Media Centre, explained that promoting the company as providing an environmentally friendly way of traveling used to be quite important for Didi's communication strategy. Specifically, Didi could contribute to lowering emissions through carpooling and reducing the time drivers spent driving around looking for passengers. Sun Qingying noted that Didi set targets for the proportion of NEVs on the platform and for building charging infrastructure. She noted that this was partly to come across as an environmentally conscious company in the government's eyes but also to keep up with the overall direction of electrification of the vehicle fleet, since that was the way society was heading. While the environmental contribution of ride-hailing has been questioned in several academic articles (K. Shi et al. 2021; B. Tang et al. 2020; B. (Biying) Yu, Li, and Zue 2020), it nonetheless has been an important part of the companies' narrative (Didi Global 2021).

By 2019, Cao Yifan understood such environmental contributions to be such an integral part of Didi's business model that it was no longer at the forefront. Therefore, creating jobs was now a more prominent selling point, and a way of showing that the company could "give back to society." The socially responsible aspect of job creation is further highlighted by employment opportunities for people who otherwise might be unemployed. Cao Yifan explained this in the context of larger-scale changes in the national economy; as the economy changes, for example, with the closing down of traditional power production, unemployment increases. While laid-off workers might find other jobs in the long-term, working for Didi could provide income in a transitional phase. Cao Yifan mentioned that Didi also highlights that it provides jobs for retired military personnel. Therefore, Didi can promote itself as contributing to social stability by lowering unemployment rates and thus contributing to "social harmony." As such, Didi has sought to position itself as a "non-conflictual employment creation platform" (Chan and Kwok 2022, 140) with local taxi companies. In short, aligning the companies' contributions to society with political goals is an important strategy for these companies.

Careful treatment of user data can also be regarded as a way for platform mobility companies to come across as responsible. A professor connected to a research community dedicated to sustainable urban development, told me about the role of data safety in government relations and explained that in the past, getting access to data from companies such as Didi and Mobike³⁹ used to be easier. However, he pointed out that the companies' data protection policies had grown more restrictive. This may reflect the overall global trends in data security policies and that some companies have an overseas market. At the same time, Hu Muyuan argued that restricting access to data should also be included in understanding how the companies aim to position themselves vis-a-vis the government.

Another way that the companies could signal that they contributed to society in the form of dissemination was to co-author reports with established research institutions. For example, researcher Hu Muyuan understood that companies such as Mobike and Didi chose to co-author reports with him and other researchers as a part of their government relations strategies. Furthermore, having their name tied to institutions with a good reputation could certainly be good for the companies' reputation.

Co-authoring reports also allowed the companies to influence knowledge production about them. Another researcher, Di Ziren, explained that some companies had researchers sign confidentiality agreements to avoid the publication of research results that would put them in a bad light. Gu Wenfeng, who was working in research and consultancy, had been working on a report with Mobike, corroborated that the companies had the final say in what the reports contained, and he stated: "Some of the data might not benefit Mobike from its public relation perspective [...] so, if they think it [data] is not for its benefit, they will not want to release it." I was particularly interested in the data in a report covering how much the use of Mobike's bicycles had contributed to reducing private car use and emissions. In this regard, Gu Wenfeng said: "Mobike insisted that we include this data, so we had no choice but to include it. The way they [Mobike] calculated that is very simple and rude. I don't think it is very reliable." Nevertheless, while Gu Wenfeng was certainly skeptical about some of the numbers in the report and thought the work had been overly rushed, he felt comfortable with having his institution's name on the final report. He thought that the most substantial

³⁹ At the same time, spatiotemporal data from Mobike are publicly available from various Chinese cities, and several researchers have used the data (some of which was collected after 2019) in their analyses (J. (Jian) Jiang et al. 2019; R. Li et al. 2022; Y. (Yuan) Li, Zhu, and Guo 2019, 4; K. (Kui) Yu 2020). However, as stated by Zhang and Mi (2018), the data that they received from Mobike was preprocessed due to privacy concerns, which suggest that might also have been the case for other studies.

mistakes in the report had been avoided, and that the report had contributed in a positive way to discussions in the media.

In sum, through dialogue with the government, and information and promotional material, the companies try to get the message across that they are a part of urban China's future and that their operations align with overall policy directions for the country. In the following, I discuss recruiting from the public sector to ensure relevant social networks.

6.3.2 Recruiting employees from the local government

In addition to aligning with overall policy directions, the companies attempt to improve their relations with public bodies and ensure information flow through employment practices. The NGO representatives pointed out that Didi attempted to attract officials to work for them by offering them higher salaries than they could earn in public office. Xia Jing noted that “some of their high management comes from the government, or government-affiliated institutes, including research institutes, and some directly from the government.” She further noted that “they use this strategy to build a good relationship with the government and to get knowledge about detailed policies and regulations from the government.” Her colleague, Meng Qishan, added that this was probably the *main* way of ensuring good relations. Beyond the platform industry, this form of elite recruitment has been referred to as a “revolving door” between business and politics (Downs and Meidan 2011; D. Huang and Chen 2016). While this is common in many countries, it is particularly important in China because it serves as a strategy for companies to avoid political risk and for the state it is a way of adapting to the marketization of the economy (D. Huang and Chen 2016). The revolving door practice is thus one example of how companies seek to be influential by allying with the state rather than by engaging in conflict with the state over policy directions (D. Huang and Chen 2016). Thus, this way of ensuring good government relations and information flow is not connected to their access to data, technology, and expertise *per se* but rather they resemble tried-and-true methods. In the following two sections (6.3.3 and 6.3.4), I will concentrate on strategies related to platform mobility companies' specific resources.

6.3.3 Sharing data and assisting in planning processes

During the fieldwork, several interviewees discussed collaborative efforts in urban planning and transport management. These included projects profiled on company web pages and

framed as disruptive and groundbreaking technologies. However, they also entailed more ad hoc, informal, and short-term efforts to assist transport planning.

Didi provides consulting services for public transport providers, particularly by providing data for the overall planning of public transport aimed at improving predictions. Didi's data were collected through their drivers, as well as by collaborating with mobile carriers. According to Huang Jiaxi, a Didi representative, the traditional data collection methods were not very well developed. She told me that the quality of the data derived from public transport smart cards was poor. Therefore, transport providers also rely on manually collected data, which often entails hiring students to count people in key areas. In this way, Didi can contribute much-needed real-time data to the local government.

Xia Zimeng told me that Mobike contributed to planning processes by answering specific queries from the local government. She emphasized that Mobike did not share raw data or user information; instead, they "crunched the numbers" for the government, which could be used for infrastructure planning. Ding Liying, the representative of the anonymous dockless pedelecs company, told a similar story and highlighted that the company would never share personal data unless it were in conjunction with a criminal case. For the most part, the company shared "heat maps" that showed spatiotemporal cycling activity, which could be used for planning purposes. Both Xia Zimeng and Didi's representative, Huang Jiaxi, expressed that while cycle data could be used for urban planning purposes, it should not be considered a central part of informing urban planning, yet it still was a piece of the puzzle that could be useful.

Furthermore, Xia Zimeng gave an example of how Mobike's data could be used for urban planning purposes. Through cooperation with the e-commerce company JingDong, Mobike has been using bicycle-related behavior data to map illegal car parking. Whenever the bicycle data showed curves in the cycle lane, it was likely that a parked car had caused the cyclist to cycle around it. In many Chinese cities, illegal parking in cycle lanes is a big problem, which is an issue for cyclists and the three-wheeled scooters used by Jindong delivery personnel. Xia Zimeng explained that data relating to illegal parking could be given to the traffic police, and in turn could give the police a better idea of problem areas and urban planners a better idea of where there was a lack of parking spaces for cars. When asked what motivated Mobike to answer these kinds of queries from the government, Xia Zimeng said:

Because this [dockless bicycles] industry relies on governments very much. We operate in a lot of cities, and if the government and the city support you a lot, you'll have very good business in the city. For example, the government will help you to protect the bicycles from vandalism.

Therefore, as discussed in section 6.2, the importance of good relations with governmental agencies motivates data sharing and collaboration.

However, the sharing of data as a voluntary act was nuanced by the representative from the company offering dockless pedelecs, Ding Yiling. Pedelecs operate in a more difficult policy environment, as the official position on dockless e-bikes has been much more discouraging than for fully pedal-driven bicycles. Ding Yiling explained that companies had to walk a fine line with transport officials and, when asked to share data with local governments, they did not understand it as a choice: “if the government asks our company to provide some data or other things, it is a must. You can not say ‘these are my data’.”

Didi did not only share data with the local government but also acted as consultants in data processing. For example, Didi worked on integration and compatibility of transport data. In other words, making various datasets able to “talk” to each other. While some countries have a national standard for transit data, in China such systems vary from city to city and from operator to operator. The public transport system is fragmented due to being managed by many different companies. For example, the Beijing metro is operated by two different companies. Huang Jiayi, and a former Didi employee, Zheng Tianhe, both told me that Didi had taken it upon itself to solve tedious tasks for the local government by making datasets from different transport providers compatible and increasing the efficiency of data collection relating to public transport.

To some extent, the findings presented in this chapter (Chapter 6) align with those from Shanghai, for which Spinney and Lin (2018, 73) argue that dockless bicycle companies use transport data to reconfigure their relation to the municipality. In other words, such data can function as a “bargaining chip” (Spinney and Lin 2018) in government relations. However, in some cases, governmental bodies present data sharing as a minimum requirement, reducing its effectiveness in bargaining. It can also, in general, be difficult for private companies in China to know what the state can and will demand from them in terms of access to data (Wang 2012; Parasol 2018). With regard to the regulatory framework on ride-hailing, there are also formulations pointing to state departments’ right to query network data (Ministry of

Transport of the People's Republic of China 2016b). At the same time, laws and regulations in China often are intentionally vaguely formulated, as Parasol (2018) points out in the case of information and cyber laws. Thus, as the companies might not know what will cause them to step over the line, there is a clear incentive for self-discipline, which seems to include data sharing.

Furthermore, my findings may nuance the argument made by Spinney and Lin (2018). The authors are quite clear on the point that the companies instrumentally use their data to improve government relations. Based on the interviews, I argue that influential people within the dockless bicycle companies are personally invested in bicycle infrastructure improvements and therefore wish to aid the local government's efforts. In addition, as the companies may have little to lose when sharing processed data with the municipalities, the motivations for sharing data should perhaps be nuanced with a less cynical understanding of the companies' motivations. One should also be careful in asserting that platform mobility company, as a category, have a coherent set of interests.

This section included a discussion on relatively small-scale collaborations between the local government and platform mobility companies revolving around data sharing. As seen in this section, platform mobility companies also perform monotonous tasks that are not fronted as high-tech projects on company websites. Still, due to the centrality of data in ITS projects, these are nonetheless important tasks that companies such as Didi have resources to take on themselves. However, platform mobility companies, and Didi in particular, engage in more extensive and ambitious projects, which will be discussed in the following.

6.3.4 Aligning with China's high-tech ambitions

Didi has developed from a company offering taxi-hailing, ride-hailing, and carpooling to "providing smart city (mobility-related) package solutions" (Noesselt 2020, 547). In this section, I discuss examples of such solutions, focusing on the Didi Smart Transportation Brain and "smartification" of public transport systems.

Perhaps at the forefront and the most widely media-covered of these technological projects is the Didi Smart Transportation Brain project, which has been piloted in about 20 cities based on cooperation with city planners and local traffic police (e.g., Borak n.d.). The pilots draw on data collected from Didi's vehicles through dashboard cameras and GPS, as well as

sensors. The aim is to increase traffic flow, assist local traffic police, and enhance safety (Borak n.d.; Zhang et al. 2019).

Didi is not the only company to have developed such “smart brain” initiatives. Alibaba has developed the Cloud solution ET City Brain, which aims to increase traffic flow and decrease dispatch time for emergency vehicles (Alibaba 2018; Alibaba Cloud 2019). These projects have also enjoyed endorsement from the national level. In 2017 Alibaba’s City Brain project was chosen by the Ministry of Science and Technology of the People’s Republic of China as one of the first artificial intelligence innovation platforms (J. Zhang et al. 2019). While Didi Smart Transportation Brain Chinese was launched together with Chinese traffic management authorities (Didi Global 2018).

The City Brain projects are based on the logic that the algorithms can process complex big data, including picture recognition, and ultimately make better decisions than the human brain and even predict future events (J. Zhang et al. 2019). One of my interviewees, Mathias Schneider, a foreign researcher with a position at a Chinese university, summed up the role of City Brain as dealing with the enormous amounts of data needed for running simulations and doing data-driven city planning.

Thus, Didi Smart Transportation Brain functions to aid collaboration between local governments, the traffic police in particular, and technology companies. Again, increased data quality has been an important aim of these collaborations (Didi Global 2018). Huang Jiayi pointed out public transport authorities rely on data from CCTV (Closed-circuit television), among other sources, to determine the most congested areas. However, she said that these data were often incorrect, and that congestion maps produced by Didi through the Smart Transportation Brain initiative were of a much better quality. These spatiotemporal transport data could also be used by the traffic police to identify areas with high risks of traffic accidents.

Xue Lina was a former algorithm engineer at Didi’s Department for Transportation Intelligence, the department responsible for the Didi Smart Transportation Brain. City Brain is very much portrayed as a high-tech project (Didi Global 2018), and while some parts of it may be high-tech, it also seems to encompass some “low hanging fruits.” As a part of the Smart Transportation Brain, Xue Lina had been working on smart traffic lights. She highlighted that smart traffic lights were one part of the project, but that they were one of the

easier technologies to realize. The necessary data are relatively readily accessible and implementation requires low infrastructure spending.

Improved traffic flow and reducing travel times has been highlighted as a central achievement of the projects (Didi Global 2018). When discussing the issue of possible rebound effects of improved traffic flow, former algorithm engineer, Xue Lina, noted that “the impact of the smart traffic light system does not have a key role in decreasing the pollution or decreasing environmental problem.”

The Smart transportation brain has the dual effect of ensuring good government relations and bringing a source of income for Didi. Xue Lina noted:

Clearly, it will help Didi to get better connections or relations with the government, as we are helping them and doing something good, but we actually also get some revenue from this [...] the government has a budget for these kinds of projects, so Didi will serve as the government’s service provider and therefore get paid directly for doing that.

Furthermore, the projects are important for Didi because they afford the company access to data from the government and they serve as research and development projects for the company. Thus, with projects such as the City Brain project, Didi has moved from simply offering rides to taking part in the political project of building smart cities (Chan and Kwok 2022).

Many of these projects seem to align with the observations of Chan and Kwok (2022, 140), who note that Didi “discursively frames itself as a collaborator with local governments and posits itself as an innovative solution to urban problems.” At the same time, some of the collaborations rather take the form of consultation assignments. While these projects may be argued to aid government relations, there might also be limits to how encompassing this strategy is. Didi is a huge company with a number of operations, yet not all of them may be strategically run with a political aim.

In addition to the city brain projects, Didi develops self-driving buses and buses based on non-fixed routes. Perhaps somewhat surprisingly, Didi has a public transport section. Huang Jiayi, a representative from the section, told me about the rationale behind it. As public transport providers are seeing a fall in revenues, Didi hopes to help them with their bottom line and try to contribute with new ways of organizing public transport. Didi’s public transport section was working on a pilot with non-fixed bus routes to avoid the most congested areas and thus prevent buses from getting stuck in traffic. Using real-time traffic data, which the company has ample access to, bus drivers could avoid congested areas but

still operate through selected base points. As congested areas could change hour by hour, and public bus operators revise their routes every year, this would allow for much more flexibility. Huang Jiayi also mentioned the possibility of having virtual bus stops in the future, but she admitted that this would require everybody to have a smartphone. Xia Jing, one of the NGO representatives, saw projects such as buses with non-fixed routes as mainly motivated by the companies' desire to show the government that they are willing to provide semi-public services to the population:

The government does not have this kind of service, like on-demand buses. In recent years, they want to improve their last-mile transport, but through the existing public transport system, people cannot get good enough services for the last mile, so Didi and other operators, including Mobike, want to solve this problem, not only for themselves but also to show their good side to the government.

Therefore, as pointed out by Xia Jing's colleague, Meng Qishan, it is central that these services are not in competition with public transport providers but rather complementary to them. Instead Didi is aiming to "find a better business model to feed the public transportation system, instead of doing the exact same thing."

In short, platform mobility companies, particularly Didi, conduct high-tech projects such as self-driving vehicles, buses operating on a non-fixed route, and big-scale data platforms aimed at traffic flow optimization. These projects receive government endorsement and are in line with the country's ambitions regarding automation (Deichmann et al. 2022), while not being in competition with the public transport network, which is the backbone of urban transport in Beijing.

Clearly, these projects speak to the prioritized political goal of innovation in China. However, China has also staked out ambitious goals to reduce the climate footprints of the transport sector. As such, it seems unclear to what extent these two goals can be achieved simultaneously through projects such as the ones discussed above. Time and again, efforts to optimize traffic flow have been found to have re-bound effects; rather than reducing congestion, such projects often have the opposite outcome (Easterbrook 2014). Furthermore, Noesselt 2020 (547) argues that smart brain initiatives pave the way for an autonomous vehicle-based, shared mobility sector (Noesselt 2020, 547). Therefore, I argue that these projects help to bring car-based transport into an imagined high-tech future instead of challenging the automobility system.

The geographical location of collaborations around technological upgrading of the transport sector is far from arbitrary. Rather these projects are located in areas that can tolerate experimentation and where leaders of municipal governments are open to such projects. They further follow a “pattern” of pre-established government relations. In the following, I underscore the importance of the local level in state-company collaborative efforts.

6.3.5 Identifying “friendly environments”

Heilman’s conceptualization of Chinese policymaking as “experimentation under hierarchy” is widely recognized (e.g., Lin and Tsai 2022; Miao and Lang 2015; Tsai and Dean 2014) and is a key part of the explanation of the country’s adaptive authoritarianism since the early 1980s (Heilmann 2011). Policy experimentation dates to before the communist revolution. Today, local experiments and model demonstrations are still guided by centrally decided policy targets and adapted to local conditions. The underlining idea is that such projects can serve as testbeds where the best ideas can be implemented in other locations or nationally. According to this logic, risk can be minimized, and knowledge can be generated from real-life on-the-ground projects (Heilmann 2011) (see also Chapter 2, Section 2.6)

Noesselt (2020) argues that the smart urbanization project of contemporary China goes beyond Heilman’s “experimentation under hierarchy.” Instead, “a broad patchwork of local test runs of smart urbanity” (Noesselt 2020, 548) might be a better characterization. Joint projects by private and public actors are implemented at high speed and in great variety, which the national government might tolerate, but in which, to a large extent, it does not have a guiding role.⁴⁰ Thus, how information travels is much less organized than Heilman’s idea of “experimentation under hierarchy” (Noesselt 2020). The location of ITS projects does not seem to be centrally guided but rather a product of company-government relations at the local level, particularly in places with what, in Heilmann’s words, may be termed “entrepreneurial local governments” (Heilmann 2017, 26). This form of entrepreneurship may also be regarded as a sort of branding exercise for a locality, as observed in administrative regions in countries other than China (Mukhtar-Landgren et al. 2019; Mukhtar-Landgren and Paulsson 2021).

⁴⁰ Smart city and urbanization projects beyond China are often implemented in a bottom-up manner, where different public and private actors implement projects more or less independently of each other (Dameri and Rosenthal-Sabroux 2014a). Smart and digital city projects are often the result of individual initiatives, rather than the outcome of coherent strategies (Cocchia 2014)

Thus, a central issue to highlight is the importance of the local level in relations between the government and mobility platform companies. In this context, the local level can mean the city, municipal, or city district.⁴¹ The local level is important not only in ITS projects but also for platform mobility's core operations, meaning operating ride-hailing and dockless bicycles. In huge cities such as Beijing, enforcement and local interpretations of regulations may vary from district to district. For example, Ding Liying, the representative of the anonymous pedelec company, pointed out that some districts in Beijing have relaxed restrictions on pedelecs. By contrast, the company cannot operate in other districts. Another example relates to the pricing policies in the ride-hailing sector. The national guidelines allow local governments to guide prices if they deem it necessary (Z. Huang 2016; Xinhuanet 2016). This point was underscored by NGO representative Xia Jing: "I think the local governments, particularly in southern Chinese cities, have the power to determine which [ride-hailing] companies can operate." In addition, the Mobike representative stressed that government relations varied from city to city and could possibly influence the number of bicycles a certain company could launch. Therefore, local interpretations of national guidelines and local enforcement practices can have consequences for the profitability and daily operations of the platform mobility companies.

Furthermore, government-state relations and interest at the local level and interest for local policymakers play a central role in where collaborations and ITS projects are established. For example, as pointed out by interviewees Huang Jiaxi and Xue Lina, Didi had been providing services for the public transport system in Jinan, in Shandong Province. In Qingdao, also in Shandong Province, Didi operated a pilot bus project. Huang Jiaxi, the representative from the public transport section in Didi, mentioned that it was vital for these companies to find a "friendly environment" in which local governments would be open to these kinds of projects. Xue Lina mentioned that Didi had a good connection with the Jinan transportation bureau, as well as with other relevant departments at the local level, and therefore collaborations had continued with Jinan.

In addition, the socioeconomic situation of cities is important for where projects and collaborations take place. In China, the more or less formal tier system of cities is of

⁴¹ It should be noted that population in Beijing's districts are in to order of several hundred thousands, and up to a few million in the biggest districts.

relevance in this regard.⁴² Put briefly, Tier 1 and Tier 2 cities have a higher degree of economic development and score higher on social indicators than Tier 3 and 5 cities (H. (Hong) Zhang et al. 2016). Xue Lina provided the following explanation:

For Tier 1 cities such as Beijing and Shanghai, the government is much more cautious about the [smart] traffic light system. [...] Didi recently started these transportation projects, so it worries that the system might cause some unforeseen problems. The transportation system in these first-tier cities is just so important that they [the cities] are seldom willing to do these kinds of test runs or the tests are only limited to a specific intersection.

By comparison, Xue Lina regarded Liuzhou in Jiangxi Province as a Tier 3 or Tier 4 city, thus involving a smaller risk. She also regarded the local transport department as willing to “try out new things and [was] giving Didi a lot of flexibility.” However, the flip side was that it was too underdeveloped for large-scale projects, such as the City Brain project. However, Didi could implement smaller-scale projects, such as smart traffic light systems. Thus, while trial projects might be less organized than China’s Special Economic Zones (SEZs) and “experimentation under hierarchy,” they do seem to follow their overall logic. Similar to smart city projects in general (Parasol 2018), adverse consequences of trial projects are minimized when the projects are located far away from the political and economic centers of the country.

Huang Jiayi, a former employee of Didi, also mentioned that local governments in Guangdong Province, such as the government of Shenzhen city, could be friendly environments. As a fairly new city and home to many tech companies, Shenzhen is known for being one of China’s major high-tech hubs. Huang Jiayi also mentioned that access public transport GPS data was much harder in Beijing, than for example Shenzhen. This tendency was confirmed in another interview, when Meng Qishan explained that the NGO she worked for had been collaborating with Mobike:

In Shanghai, the institutional framework is a bit better than in other areas. Like in Beijing, the central government and the local government are both in the same place, so a lot of the time the decision-making process is longer and more complicated, and therefore it is harder to do innovative pilots in Beijing. So, Shanghai is more flexible, and, for example, Shenzhen and

⁴² The classification of first, second and third tier cities was introduced by the government in the 1980s as a tool to direct the government’s development priorities. However, it is also been adapted by commercial actors, and it serves as a proxy for socioeconomic development across the country. It is based on characteristics such as economic development, transportation system, infrastructure and cultural significance. First-tier cities are characterized by high immigration from other parts of the country, high-quality resource aggregation and extensive purchasing needs, and often higher prices and higher quality social welfare services. While second tier cities score lower on these indicators, they have more potential for future growth and often well-developed transport systems. The population in third-tier cities are usually under 1 million, and the economic development and market consumption in third-tier cities are even lower than in the second-tier cities (H. Zhang et al. 2016).

Guangzhou are closer to Hong Kong, and they have some exceptions to the policy decisions. They can try some new things in their cities, but not in Beijing.

Thus, in addition to the risk involved with doing pilot projects in Tier 1 cities, the institutional framework is important. Notably, due to the central government being located in Beijing, Meng Qishan understood decision-making processes there to be sluggish and policymakers to be more risk-averse. Additionally, the administrative hierarchy in China should also be understood as a part of this understanding. Thus, less developed locations and areas with a history of policy experimentation, such as Shenzhen,⁴³ appear to be better sites for trials. While there might not be an overall strategy for locating projects to such areas, and thus not fitting the umbrella of "experimentation under hierarchy," the localization of projects does tend to follow a pattern where certain locations may act as testbeds for organization and technology that can later be implemented at the "center." In other words, locating and making ties with extermination-willing local governments is of key importance. Such locations are often understood as located either in the south of China, close to the border between China and Hong Kong, or in locations of relatively small economic and political importance.

6.4 Concluding remarks

The first sub-question I pose in this chapter, is; *How have the operations of dockless bicycles and ride-hailing been increasingly formalized through regulations?* Importantly, I outline that ride-hailing ended up being regulated similarly to traditional taxis. However, regulators also address competition between ride-hailing companies and taxi providers, vehicles and drivers, passenger safety, and systems for evaluating operators and drivers. In the case of dockless bicycles, the most crucial aim for regulators was to deal with the oversupply of bicycles and the handling of user deposits.

Regulatory approaches to smart mobility are often understood to lag behind technological developments (Docherty, Marsden, and Anable 2018). In the early years of platform mobility, regulators certainly struggled to keep up. Still, the case of platform mobility in China tells a

⁴³ Shenzhen was one of China's first Special Economic Zones (Lin and Tsai 2022).

different story. Namely, state actors in China, particularly in recent years, have taken an active approach to defined technological capabilities. In short, the case of regulating platform mobility in China is also an example of the many ways in which governance and technology are co-produced. To understand regulators as simply “running after” or adapting to technological development is, therefore, too simplistic.

I also addressed the following sub-question: *How can we understand the importance of good government relations?* In this chapter, I have sought to contextualize the relationship between platform mobility and the state in the current political climate in China. Structured uncertainty (Breznitz and Murphree 2011) is a relevant concept for understanding this context. Most companies operating in China are subject to structured uncertainty, making it difficult to know when they are crossing the line in their relations with the government (Breznitz and Murphree 2011). While bending regulations might be a part of the business model of these companies, it might be difficult to know when they cross the line in a major sense, or, in other words, whether boundary crossing would result in “a small slap on the hand” in the form of a fine that would seriously harm their ability to operate? While good government relations are important for private companies operating in China in general, I argue that it is particularly important for platform mobility companies. As such, the case of platform mobility serves as a window for understanding Chinese policymaking, as it represents a quite unique case keeping in mind the controversies surrounding the sector.

China’s ambitions to be a global leader in transport technology and innovation (Central Committee of the Communist Party of China 2015.; Ibold and Li 2019) should be included in understanding of platform mobility companies’ position vis-à-vis the state. Through cooperation with the state, the companies have a position as providers of smart city solutions and ITS solutions in a drive for an increasingly tech-driven economy and infrastructural operations. Importantly, the companies are engaging in pilots. In this manner, their expertise and technology might be recognized in the longer term as essential for future projects. Against this background, I argue that platform mobility companies should be regarded as sociotechnical configurations of state-led “smartification” projects in the transport sector. Thus, they not only gain infrastructural properties in everyday life but also serve infrastructural functions for the state. In other words, they gain infrastructural properties both in a theoretical sense (J. Y. Chen and Qiu 2019; Star 1999) and in the more colloquial understanding of the term. Thus, as platform mobility companies grow as sociotechnical systems, they expand into cooperation with the state.

The last sub-question addressed in this thesis is; *What strategies are platform mobility companies applying to ensure information flow and policy influence, and what is the role of technological projects and data in these strategies?* The chapter has discussed strategies of improving their image, recruiting from the public sector, sharing data, high-tech projects, and identifying “friendly environments.”

In the discussion of these projects, I aim to nuance the understanding of these projects as solely targeting policy influence in a deliberate and calculated manner. Sharing data, assisting planning processes, and so forth may be driven by, for example, the desire to perform services in personal networks or to function as research and development projects for the platform mobility companies. It can be questioned to what extent the companies had influence over policy outcomes (Cao et al. 2022). In addition, as some interviewees pointed out, the companies simply have little to lose. Thus, instead of asking “what is in it for them?” one could ask “what do they have to lose?” and that might not be much at all.

Still, while keeping this nuance in mind, the importance of maintaining good government relations was articulated repeatedly in the interviews and supported by published studies of platform mobility in China (Chan and Kwok 2022; Spinney and Lin 2018). For example, Chan and Kwok (2022) argue that Didi’s strategy of collaboration differs from the more confrontational role that Uber takes vis-à-vis the state in the US. In the case of dockless bicycles in Nanjing, Cao et al. (2022) found that the mutual understanding between dockless bicycle companies and the local government grew over time as local government representatives saw that they could better achieve policy goals by also meeting the considerations of the companies based on an understanding of mutual interests between the parties (Cao et al. 2022).

The technological projects discussed in this chapter, such as smart traffic lights and City Brain, may not neatly fit the concept of “experimentation under hierarchy” guided by the state (Noesselt 2020). Still, the projects may act as testbeds for the companies themselves. Importantly, test projects are implemented in areas understood as politically less risky. In other words, it is easier for municipalities and city governments that are farther from the political center to participate in such projects. Moreover, the testbeds are not purely technological. Rather, as suggested by STS scholars working in other national contexts, transport technology experimentation also provides insight into how regulators and society at large respond to and learn about the innovations (Haugland and Skjølsvold 2020; Stilgoe

2018). Thus, technical experimentation also put social arrangements to the test. Through pilots and trials, the platform mobility companies discussed in this chapter do not only gain “hard” knowledge about traffic flow and identify accident-prone areas, but they also gain knowledge about the workings of the state.

The Chinese state has given platform mobility a place in an envisioned sustainable transport future. Still, it remains ambiguous as to exactly how the companies are conceived to contribute to overall policy goals on, for example, sustainability, congestion, and health. For instance, as the sustainability of dockless bicycles remains contested, specifically how they will contribute to building a green transport system remains vague, despite the insistence on a “scientific” approach to dockless bicycles from the government’s side (Ministry of Transport of the People’s Republic of China 2017c). While the inherent “goodness” of technological progress can be recognized across countries (Bareis and Katzenbach 2022), it is particularly salient in the Chinese way of approaching policy rationalization. One might question whether these technologies are seen as solutions for the future simply by virtue of being new. Similar observations have been made within STS beyond China. For example, Stilgoe (2018, 47) argues that many regulators take a “technology-first approach.” Thus, governments often fail both to formulate desirable transport futures for transport technologies and to specify exactly how these technologies are envisioned to be used in research on overall policy goals such as decreased emissions (Haugland and Skjølsvold 2020). While regulations have addressed aspects such as technical capabilities, work relations, and safety, the overall contribution from these companies remains unclear. As Chinese regulators stake out ambitions for platform mobility, they risk remaining ambitions as the link between technology and societal outcomes remains unspecified.

6.5 Epilogue: The “crack down” on the technology sector in 2021

The chapter has highlighted cooperative efforts between the state and the platform mobility sector. However, two years after I left China, in 2021, a considerable policy shift took place that affected the technology sector.

In 2021, China's regulatory environment changed rapidly in several policy areas, such as education policy, cyber security, lending, data protection and privacy, and cryptocurrency (the China Project 2021) nick-named the "the red new deal" (Che and Goldkorn 2021). Efforts to control corruption, capital flow, and monopolistic tendencies have greatly impacted technology companies, including platform mobility (the China Project 2021). For example, anti-trust regulations have been implemented to destabilize the tech sector's monopolistic tendencies and break up the tightly-knit app ecosystems (the China Project 2021). Noesselt (2020, 556) argues that "While the international debate has so far been (mis)guided by the idea that the PRC's AI companies operate without any ethical red lines or legal regulations, the recent debates among Chinese scholars as well as within civil society clearly evidence a growing awareness of the issue of privacy and data protection."

Of particular importance to debates in this chapter is *The Personal Information Protection Act* launched 2021. The law is modeled after the European GDPR (General Data Protection Regulation) but can be understood to be even stricter in providing protection for individuals and less protection for corporations and state organs (the China Project 2021; You 2022). The intention behind the Personal Information Protection Act should be interpreted quite literally according to the law's stated intention: protection of privacy and limiting the use of biometric information, including facial recognition (Daum and Kuo 2022). Important for the discussion in this chapter, however, is that the law aims to "rein in" technology actors that have become too powerful (Daum and Kuo 2022). This particularly relates to power stemming from market concentration. In China, the market concentration of some of the biggest technology companies is particularly high. For example, in e-commerce, the top three players control 84% of the market. Two ride-hailing companies control 92% of the market, and Didi holds the vast majority of this 92% (the China Project 2021). Further, these monopolistic tendencies are reinforced by the tightly knit app-ecosystems, or "walled gardens," meaning that the companies are restricting movement from one app ecosystem to another (the China Project 2021). Therefore, the law also addresses the integration between platforms, as discussed in this chapter.

In addition to the privacy regulations, the control over capital flow from China to other countries – and perhaps even geopolitical tension – became very apparent for Didi when they tried to list on the international stock exchange. Only two days after they listed, the app was removed from Chinese app stores. The order was sent from the Cyberspace Administration of China, who also launched an investigation, reported to be likely due to reasons related to

cyber security (Niewenhuis 2021; Zhang et al. 2022). As China observer Rui Ma (the China Project 2021) argued, Didi's listing was determined by the central government to be a threat to data security and national security. The strict response from the government should therefore be understood in the context of increased focus from the central administration on "data sovereignty" and "cyber sovereignty" (Niewenhuis 2021).

In November 2021, Didi announced that they would comply with the state mandates and delist from the New York Stock Exchange (Che 2021). While the removal from the app stores did not affect users who already had the app installed, it did prevent further growth of users (Niewenhuis 2021; You 2022).

Further, Didi and the state have conflicting stories about what happened prior to the international listing. The Wall Street Journal reported that the central government had asked Didi to delay listing on the international stock exchange (L. Wei and Zhai 2021). Yet, Didi announced that they had received mixed messages from the central government and were unaware that the investigation by the Cyberspace Administration would be started (Niewenhuis 2021).

On the one hand, the implementation of these regulatory changes may serve to destabilize the platform mobility. On the other hand, the perceived need for anti-trust regulations points to the central position of these companies. In other words, they have become too powerful and thus require additional oversight and control. The need to "rein in" these actors points to the infrastructural functions these companies have had, and still very much have, and therefore it is a need to challenge their position. Additionally, the change in policy directions that started in 2021 underscores the importance of the local level. In this chapter, I have argued that platform mobility companies – to some extent – have a say in local interpretations of national guidelines and policies. Their ability to influence national outcomes is much more restricted. Therefore, in the context of geopolitical tension and prioritized overarching policy interest, the interest of platform mobility companies is certainly not adhered to. As such, while the companies seek to become important players in the technology and transport sector, they are still very much small fish in the context of big politics.

7. Private Car Ownership: Norms in Transition?

The previous chapter (Chapter 6) discusses the regulatory environment in which platform mobility companies operate, how the companies seek to enhance their impact on the regulatory framework, and the role of ITS in cementing their role in society. While the thesis as a whole investigates platform mobility through its sociotechnical configurations, Chapter 6 also positions platform mobility as a configuration of the Chinese government's ambitions for technological developments in urban transport.

This chapter (Chapter 7) takes private car ownership as a starting point, which is important for understanding the mobility context in which platform mobility operates. It is vital to focus on the ownership and use of cars for several reasons. The car has been, and to a large extent remains, a central technology that mobility systems are built to facilitate. This has also been the case in China since private car ownership was first embraced and became regarded as a token of modernity and progress. Mass motorization has had serious consequences in terms of public health, pollution, CO₂ emissions, and traffic congestion. While Chapter 5 discussed the role of the car from a historical context, this chapter discusses the role of private car ownership in contemporary China.

The “stickiness” of car ownership comes from the car being much more than a transport tool. Therefore, to have a better understanding of platform mobility in Beijing, we should also understand the constructions of car ownership, as platform mobility competes and is embedded in the automobility system. It competes in terms of partly being an alternative. It is embedded particularly in the material and habitual configurations of automobility. For this reason, in this chapter I aim to shed light on the context and conditions of platform mobility, of which automobility cultures are an important part. This, in turn, accounts for why I have included a chapter on car ownership in this thesis on platform mobility.

As stated in the introduction to this thesis (i.e., Chapter 1, section 1.1), I address the following research question (RQ1): *How have cars and bicycles been reconfigured (politically, socially, and culturally) since the establishment of the People's Republic of China, and to what extent does platform mobility shape the understanding of private car ownership?* By continuing to address the same research question as Chapter 5, this chapter

thus picks up the thread in a contemporary context. I further specify this question by addressing the following questions: *How have barriers to car ownership and use reconfigured ideas around car ownership? How are links between car ownership and social situations (marriage and situations of performance) upheld and broken?* To answer these questions, this chapter, similar to the next chapter, draws on domestication theory and constellations of mobility and thus understands private car ownership through spatio-temporality, embodiments, and as symbolically situated.

The chapter starts by exploring some of the most prominent barriers to car ownership and how the interviewees related to these barriers. Furthermore, I discuss how, on the one hand, the car is understood as a vehicle for recreation, freedom, and exploring, and thus an element in the idea of the good life, and how, on the other hand, it is understood as a slow-moving and unpractical mode of transport. I unpack how such varying understandings related to car use in different contexts. Thereafter, I explore shared representations of car ownership in the context of different social situations and established social networks. I focus on understandings of norms relating to car ownership and marriage, but I also discuss other everyday situations, such as meetings and social gatherings. The empirical material in this chapter sheds light on how shared representations are co-shaped with physical mobility and embodied aspects. However, first, I will review relevant literature for this chapter.

7.1 Car ownership, everyday life, and life events: perspectives from literature

In recent decades, car ownership and use have promised the ability to move around freely and comfortably (Dennis and Urry 2009; Hagman 2006, 2010; Kent 2015; Urry 2004; Wollen and Kerr 2004). Nevertheless, in light of parking issues, queuing, and deadlocks, it has also been questioned whether this freedom was ever anything but a promise made by the automotive industry (Hagman 2006, 2010). Moreover, among younger adults, particularly those living in urban environments in Western countries, the lure of freedom, status, and convenience of car ownership is often questioned (Delbosch and Currie 2013; Green et al. 2018; Hopkins and Stephenson 2016). Similar findings have been made in China, where car ownership appears

less important for the younger generations than for older ones (M. Zhou and Wang 2019). Traffic congestion, expensive parking, including a shortage of it, and car ownership and use restrictions make car ownership in urban China even more problematic than in most Western countries (B. (Biying) Yu, Li, and Zue 2020; J. (Jun) Zhang 2019). Still, there is also a strong case to be made for the fact that the car remains an important aspiration in the ideas of the good life among the middle class (Williams and Arkaraprasertkul 2017; J. (Jun) Zhang 2019), also among young segments of the population (Deloitte 2019; C. Zhu et al. 2012).

While it might be possible to identify “cracks” (Geels 2012) in the automobility regime, such as changing attitudes among young people, climate change (Pinhate et al. 2020), and urban planning increasingly facilitating alternative transport modes (T. Haas 2020), automobility is still tied to a number of stabilizing mechanisms (Geels et al. 2012; Holden, Gilpin, and Banister 2019). Cars remain highly symbolic artifacts, with a set of social norms tied to their ownership and use (Cresswell 2016; Ramakrishnan et al. 2020; Schwanen, Banister, and Anable 2012). Also, mobility is very much related to embodied habits (Schwanen, Banister, and Anable 2012; Shove and Walker 2010), particularly in terms of comfort (Hansen 2016; Kent 2015). In addition, in urban contexts with high levels of air pollution, the ability to breath air filtered through a car’s air conditioning system is often understood as healthier than being outside (Hansen 2016). In short, private ownership is not just driven by the need to get from A to B in the most cost and time-efficient way. Rather, mobility practices are shaped by a number of factors related to aspects such as technological progress, industrial linkages, changes in the market, different forms of power relations, cultural trends, embodied habits, and social relations (Geels 2002, 2014; Urry 2000).

Multifaceted understandings of automobility have sprung from various schools of research, including transitions research, anthropology, the mobilities turn, and practice theory. Such traditions have provided a rich appreciation of the longevity of automobility, as well as its cracks. I draw on this strain of the literature on automobility cultures in this chapter. Furthermore, it is to this strain that the empirical material in this chapter makes a contribution, particularly regarding the longevity of and cracks in automobility. Moreover, the ethnographic contributions by Jun Zhang and Beth E. Notar, which investigate the role of the car in contemporary urban China, are of particular empirical relevance in this chapter. Their contributions unpack and problematize relations between modernity and the car, as well as relations between physical and social mobility (Notar 2012, 2016; J. (Jun) Zhang 2019). However, there are also some limitations in the existing literature.

Contributions from the above-mentioned research traditions mainly focus on the everyday configurations of mobility (e.g., Hansen 2016; Ryghaug and Toftaker 2014; Svennevik 2022; Zuev 2018). At the same time, various mobility technologies do not only play an important role in everyday travel. Literature based on behavioral studies highlights the need to focus on life events and the meaning of adulthood to understand mobility practices (e.g., B. Clark, Chatterjee, and Melia 2016; Menon et al. 2019; Prillwitz, Harms, and Lanzendorf 2006). In addition, mobility biographies research has contributed to an understanding of the connection between mobility trends and events such as childbirth, career changes, and moving (e.g., Sattlegger and Rau 2016; Scheiner 2007; Uteng, Julsrud, and George 2019). While behavioral studies and mobility biographies research contribute important empirical insights from a quantitative perspective, there is a need for qualitative studies, as they are better positioned to shed light on meaning production around such life events. Meinherz and Fritz (2021) and McLaren (2018) and have qualitatively approached child-parent mobility and highlighted the close symbolic ties of the car to adulthood (McLaren 2018). Sattlegger and Rau (2016) analyzed meaning production and socio-material relations among car-free households from a qualitative mobility biographies perspective. Still, the research on the importance of life events, such as marriage and childbirth, in connection to mobility practices and vehicle ownership needs further development (Meinherz and Fritz 2021) and should particularly draw on empirical contexts outside the Western world. In this chapter, I take as a starting point that life events and the daily workings of mobility are intertwined, meaning that the car has a particularly important role in life events as they provide important groundwork for the configurations of everyday life.

Furthermore, moving beyond the Western context and to Beijing provides an interesting empirical context for studying changes relating to norms of car ownership. Importantly, the case of Beijing highlights how shared representations of car ownership are mediated by the practical obstacles of car ownership and use.

Thus, this chapter makes several empirical contributions. The understandings of car ownership presented in this chapter serves as a case of how shared representations are impacted by policy changes and the physical environment. The chapter is positioned to address the gap in the empirical understanding of vehicle ownership and life events. Furthermore, in a more general sense, it contributes to the burgeoning literature on vehicle ownership and use in the presence of platform mobility (e.g., Menon et al. 2019). I argue that

keeping a keen eye on the symbolic aspects of car ownership is particularly important, as these are social functions of car ownership that are not easily replaced by platform mobility.

7.2 The bumpy road to car ownership

Beijing is an interesting context to study platform mobility as there are very strict regulations on car ownership and use. In the following, I will discuss users' understandings of these regulations and other barriers to car ownership, including maintenance and costs.

Undoubtedly, buying a car in Chinese megacities is difficult and Beijing is no exception. Obstacles mentioned during the interviews were paying for the vehicle itself, maintenance, fuel prices, insurance, and parking spaces, which can be particularly expensive in the biggest cities in China. Even interviewees that self-identified as middle-class or had relatively high incomes struggled to afford to pay for a car and the associated costs (for a fuller discussion of income and costs, see J. (Jun) Zhang 2019, 44–46). Wu Zhen, a woman in her late twenties, who was working as a translator for a private company, explained that the total cost of a parking space, maintenance, and all the other expenses connected to having a car was beyond her budget. She also noted that having a car required time and energy, which she could not prioritize. In other words, the car is not only a source of saving time but can also be understood as a considerable time drain. Even Chai Guojiang, who owned a car, thought that maintenance could be an annoying or troublesome concern. Neither he nor his wife spent much time on car maintenance and upkeep, rather jokingly told me that he did not even bother to wash his car but that rainy days were car-wash days. In a demanding everyday life, where time is a major concern, prioritizing car appearance is difficult. Thus while the car may be an important social signifier, and for example, Notar (2012) illustrates the time invested in car associating, making time for the car is certainly not something everyone can find the time to do.

Cost and maintenance are certainly barriers to car ownership beyond China. However, in addition to barriers that can be recognized across geographies, several of the largest cities in China, including Beijing, Shanghai, and Guangzhou, have implemented restrictions on vehicle ownership through the *vehicle quota system*. The number of license plates issued

monthly is restricted through bidding or lotteries, or a combination of them (Valler 2017). In Beijing, the vehicle quota system was implemented in 2011, and license plates are distributed through a lottery system (Zhuge et al. 2020). Due to the large number of participants in the lottery, the chances of winning are slim. The success rate in Beijing for obtaining the right to purchase a fossil fuel car decreased from 9.39% in 2011 to 0.04% in 2019 (J. Zhu et al. 2020). In most cities that have implemented the vehicle quota system, a separate quota is reserved for EVs and winning chances are higher for EVs (J. Zhu et al. 2020). In addition to the vehicle quota system that restricts ownership, Beijing also restricts vehicle use through even-odd rationing based on license plate numbers (Xie, Tou, and Zhang 2017), meaning that a car cannot be used every day of the week. Therefore, the combination of the vehicle quota system and even-odd rationing means that there are regulatory limitations to both vehicle ownership and use.

Several interviewees mentioned vehicle quotas as one of the most important barriers to car ownership. Many did not even meet the requirements to participate in the lottery. To participate, they either had to hold a Beijing *hukou* or to have paid social insurance and income tax in Beijing for five years consecutively (J. Zhao and Wang 2012; Yanga, Muñoz-García, and Tang 2017), in addition to holding a driver's license (A. A. Liu et al. 2018). In this manner, the *hukou* system does not only restrict access to social welfare and social mobility (Cai 2011; X. Huang 2020), but also the ability to acquire a car.

While it is possible to drive a car registered outside Beijing (i.e., a non-local car), the practice is highly restricted, and the related policies are some of the strictest in the country (P. Li and Jones 2015). For example, driving within Beijing's 5th Ring Road during weekday peak hours is illegal (P. Li and Jones 2015). If caught breaking the rules, points can be deducted from the driver's license and the driver will receive a fine. Cheng Yong was the only interviewee who owned and used a non-local car, which he used only for traveling outside the city and for vacations. He hoped to be given a local license plate but had been unsuccessful for six years. Cheng Yong assumed that if he had applied for an EV in the lottery system, he would have had a local car by the time when the interview was held. However, he did not consider the technology mature enough, particularly regarding the driving range in winter.

The unpredictability of when people can buy a car complicates the planning of the car-buying process. This uncertainty can be difficult to negotiate for those not planning to settle down in Beijing, as they do not know whether the waiting time will be a matter of months or years.

Nevertheless, it can undoubtedly be difficult also for people planning to stay in Beijing. For example, 24-year-old Li Junqi was born and raised in Beijing. She was in the process of taking lessons to get her driver's license so that she could sign up for the lottery. She assumed getting the license plate would take three to four years. In the meantime, she planned to save money to purchase a car. If she were awarded a license before she had saved up enough money to buy the car she wanted, she planned to buy a cheap, secondhand car. The reason was that people need to register their license to a car within six months to prevent losing the license plate altogether, after which they can register the license to a new car if they wish to upgrade it (A. A. Liu et al. 2018).

The vehicle quota system can even have consequences for family life. A. A. Liu et al. (2018) found that, due to the importance of the car in family life, the introduction of the license plate lottery had an unintended negative effect on fertility rates. While it is difficult to say whether this situation is temporary, A. A. Liu et al. (2018) argue that the decrease in fertility might be explained by people deciding to wait to have a child until they have won the lottery. Since A. A. Liu et al. (2018) conducted their research, Beijing Municipality has increased the chances of families winning the lottery, including multigenerational families living under the same roof (Y. (Yilin) Chen 2020). Still, a significant degree of uncertainty remains, as the lottery does not make it easier for those planning to start a family. Therefore, the vehicle quota system puts additional pressure and uncertainty in a highly competitive urban China, where considerable planning is put into education, the job market, and car and home ownership. As put by Thomason (2021, 455), "The retreat of the Party-state not only created new opportunities, but also new anxieties about social positioning and individual responsibilities."

There are alternatives to waiting to be awarded a license plate through the lottery. While formally illegal (J. Zhu et al. 2020), licenses are dealt with and given as gifts among people (Daljord et al. 2021). For example, Chai Guojiang, who had married a few years before the interview, told me about the complicated way he and his wife had secured a Beijing-registered car. He did not fulfill the requirements to participate in the lottery, and his wife had been participating in the lottery without success for eight years. Then, a business relation of his mother-in-law had obtained a license plate number through the lottery and had chosen to lend it to the couple in order to secure good relations (*guanxi*) with his mother-in-law. He admitted that there were some risks associated with this arrangement, such as if the relations turned sour or if the couple broke traffic rules. However, Chai Guojiang mentioned that there was a way to have the license registered in his wife's name:

There is a very interesting method of getting the license. If I divorced my wife and my wife then married to this guy [mother-in-law's business relation], she would then get his license after their divorce, and then remarry me [laughing].

While his wife and his mother-in-law were on board with the plan, his own parents were not comfortable with it, so the couple had not gone through with the plan. The example shows how the license plate lottery can play into quite complicated social relations, but not ones that are completely risk-free.

The car's symbolic association with freedom is tied to the notion that it is a mode of transport that can take one just about anywhere (Sheller 2004; Urry 2006). While this symbolic connection to freedom primarily originated in Western countries, the car may be more closely tied to convenience in China (J. Jun) Zhang 2019). Still, associations with freedom are not all but missing in China (Williams and Non Arkaraprasertkul 2017). Due to the vehicle quota policies in big cities, not only access to cars but also where drivers can drive their car is restricted. Rather, this "freedom" is dependent upon the letters on their license plate. A car is not something that can simply be taken with the owner when they move to cities such as Beijing, Guangzhou, and Shanghai. Thus, license plate restrictions undermine one of the most central promises of car ownership. As seen through the empirical examples, the symbolic meaning, in particular the car's association with freedom is mediated through the practical obstacles.

In addition to restrictions on where people can take their car and what weekdays a car can be driven, the time when they are able to buy a car is quite arbitrary and thus difficult to plan, which thus weakens the connection between the car and freedom. While mobility in most places in the world certainly is restricted by personal economy (W. Lin 2012), and this is certainly also the case for Beijing, car ownership in Beijing is not simply a matter of personal economy.⁴⁴

In order to understand the importance of private cars in solving everyday demands, an understanding of its alternative – beyond platform mobility – ought to be explored. In the following, I will detail how the interviewees relied on different modes of mobility and their understanding of the public transport system.

⁴⁴ Regardless of policy, the richest segments of the population are able to purchase a car through illegal trading (Daljord et al. 2021).

7.3 Solving everyday demands with different modes of transport

It is important to differentiate between owning and using a car for most mobility needs (Hansen 2017b; Martens 2004; Notar 2012). In urban settings with slow-moving traffic, such differences can be particularly pronounced (Hansen 2017a; Notar 2012), which is also reflected in my empirical material. Most of the interviewees relied on different modes of mobility, and the metro was often praised for being efficient.

According to some interviewees, using a combination of different mobility modes related to economic spending and managing temporal demands. For example, car owner Chai Guojiang stated:

I think, even as a part of the middle class, I cannot afford the petrol prices and car parking fees, so I prefer to take the metro. In this way, I also avoid the traffic jams and make sure I can arrive on time. In some cases, I'll also take a shared bicycle.

Similarly, Cheng Yong, who owned a non-local car, did not use his car for everyday traveling. For commuting, he used a combination of the metro and dockless bicycles, and used his scooter to take his son to and from school. Cheng Yong also used a shared car for day trips outside the city, as it meant his family could transport picnic items. Therefore, in urban China, it is not uncommon to use a range of different modes of mobility for solving different tasks in everyday life (Notar 2012; Zuev 2018). The example of Cheng Yong's mobility practices illustrates how wide a variety in modes of mobility can be applied.

Car ownership and use were often described as expensive, difficult, and often a slow mode of transport. By contrast, the public transport system in general and the metro in particular were often understood as convenient and predictable. Most of the interviewees relied on some combination of public transport, platform mobility, and/or walking to solve most of their everyday travel needs. Wan Zihan had recently moved to Beijing and was very impressed with the metro system: "the metro in Beijing is so convenient! It takes you everywhere! Every corner in Beijing." The number of obstacles related to car ownership and use might therefore increase the chances that public transport becomes domesticated. In other words, people learn how to use the metro, integrate it into their everyday practices, and it gains symbolical connotations to convenience.

However, the convenience of public transport certainly depends on where a person lives, as highlighted by Wang Anan:

[Whether I will get a car or not] depends on the infrastructure, the public transportation, and how convenient it is. For example, if I can take the metro anywhere in a very convenient way, it will be OK for me not to have a car. If not, if I would need a car or a taxi to get around and I would try to buy a car.

However, to avoid being stuck on a crowded metro train for too long, some prioritized living close to work. Zhang Yunlong also stressed that the importance of a car was related to where one lived. However, he also pointed out that if he were to settle in Beijing and buy an apartment, he would have to find somewhere to live far from the city Centre due to housing prices. Thus, housing prices might lock someone into car ownership.

It should be noted that most of the interviewees were young adults on the brink of “real” adulthood (see Appendix E for an overview of age and occupational status). A few were married or engaged, and even fewer had children. Therefore, the fact that few of them regarded car ownership as a necessity in everyday life should be understood in the context of their life situation. I will return to a discussion on life situations, particularly marriage, after discussing the car’s link to vacation practices.

7.4 Exploring and being stuck

As discussed in the previous section, bicycles, public transport, and e-bikes are used for everyday activities. In comparison, many use cars predominantly for leisure activities outside the urban core (Notar 2012; Zuev 2018). Several interviewees positioned the prospect of owning a car for exploring the countryside and enjoying the fresh air and the scenery as a part of a project to improve their quality of life. Drawing on Notar (2012) and Zhang (J. (Jun) Zhang 2019), I argue that the car’s connotations to grand narratives of freedom should be understood in highly contextualized forms. Thus, day trips and vacations outside the city might be incorporated into the modernistic promises of car ownership, whereas driving in the city might be associated with “stuckness” and unpredictability. The difference between driving in Beijing compared to driving in other places was exemplified by Chu Xiaoyan:

If I were still living in my hometown, I would have driven for a long time by now, but [...] in Beijing the traffic is very heavy, so traffic is a big part of the reason why I don't have a car here. Driving might make me late for work.

In a similar vein, several of the interviewees mentioned that if they moved back to their home province, it was more likely that they would buy a car. Many of the interviewees came from cities considerably smaller than Beijing, where car use and purchase were not restricted. Most interviewees planning to live in Beijing or other megacities were still undecided or had no plans to buy a car. Thus, it was apparent that the aspirations for car ownership were mediated through the practical aspects of obtaining a car and the physical environment, particularly with regard to traffic congestion. In this manner, policy restrictions on car ownership and use, and other barriers such as traffic congestion and parking issues, complicate the relationship between social mobility and car ownership. For example, while moving from a smaller city to a Tier 1 city might embody a form of social mobility, life in a new city might not mean easy access to a car. In other words, while in many countries moving up the social ladder includes the possibility of car ownership, this possibility is less straightforward in the largest cities in China.

J. (Jun) Zhang (2019) notes that car ownership of ordinary brands (i.e., brands not associated with high status) among the middle class in China is primarily related to convenience. Convenience can be understood in terms of managing temporal demands and thus is not only about saving time on a given travel distance (J. (Jun) Zhang 2019). However, even managing such temporal demands can be challenging with a car, both because the car cannot be used every day of the week and because car travel can be an unpredictable means of transport.

A car can provide a sense of independence that is not related to others' gaze but rather to a feeling of freedom and comfort. Thus the ability to move around is tied to ideas of what a good life entails. Li Junqi used public transport every day, which she found quite convenient. Still, she dreamt of owning a car. To her, car ownership was tightly intertwined with a feeling of independence—a sense of control over her own life and not being dependent on others. She also thought that a car would give her confidence and more time for herself. The importance of getting a car “for yourself,” irrespective of others' views, was echoed by Chu Xiaoyan:

It's about making your life even better. If I buy a car, it is not because I want to tell people that I have a car. I just want to do it for myself. I want to enjoy myself, make long journeys, and be more comfortable.

Therefore, it is also of central importance to understand the embodied aspects of car ownership (Cresswell 2010) or how car ownership is imagined to be embodied. Such aspects are certainly not only tied to recreational activities but also to everyday travel. Li Jinqi's work required her to travel around the Beijing, and she was looking forward to getting a car:

When you get off work, you are exhausted, and you do not want to walk. You just want to sit down, but [...] the rush hour in Beijing is horrible and going from the east side to the west side, where I live, is horrible. It can even take two hours sometimes, and that can cost more than 100 yuan [14 USD] in taxi fares. So, I feel like, if I had a car, I could just sit in the car and ride slowly and maybe listen to some music, yeah! I think that's also a way of relaxing.

Thus, Li Jinqi was not much worried about the amount of time spent in traffic when driving because it also provided a space to relax. In particular, with Chinese working hours, the comfort of a car should not be underestimated. In this manner, the car can be conceptualized as a "home away from home" (Collin-Lange 2013). In other words, the car can serve some of the same recreational capabilities as a home, in a context where one does not have a lot of "down time" after work.

The examples presented above further nuance the connection between the car and freedom, as well as exploring recreation and leisure. Put simply, driving has more than one meaning. Driving for commuting is often associated with "stuckness," whereas recreational use of cars outside the big cities embodies an ethos of freedom (Notar 2012). The car offers a link to the open road and clean air. Driving for day trips and vacations is associated with aspirations for what a good life looks like; as Chu Xiaoyan said, it something one does for oneself to improve one's life. Such trips may very much remain aspirations even if one acquires a car in the face of a highly demanding work life. Still, they are nonetheless a part of what people think about when they think about car ownership. In other words, weekend trips and traffic jams are not only a part of the embodied and material conditions for car ownership, they are also fodder for shared representations of car ownership.

As already stressed, to understand platform mobility, we must have a better understanding of the conditions in which platform mobility is embedded. The embodiments, material conditions, and shared representations presented above in this section tell us something about the longevity of the automobility system. Some of the functions of automobility, such as the ones connected to having a good quality of life, may perhaps be covered by platform mobility. However, car ownership also plays an important role in social settings that are not easily

replaced by platform mobility. I discuss examples of this in the following two sections (7.5 and 7.6).

7.5 To have and to hold? Marriage and car ownership

In China, social norms are quite explicitly formulated around material commodities and marriage. For example, the term *luo hun* (“naked marriage”) specifically refers to marriage without a car and a house (J. Zheng 2020). Therefore, the car functions as a symbolic artifact vis-à-vis family, friends, and the larger social network, particularly when someone is to be married. Further, through marriage, the car’s practical role in family life becomes particularly prominent. Thus, the importance of marrying a car owner can be understood as relating both to the actual fact of movement and to shared meanings. As argued by Zavoretti (2016), the need for a car in marriage can be regarded as a reflection of contemporary consumer society, but also as representing security in a more competitive and uncertain post-Maoist society.⁴⁵ As discussed in Chapter 5 (section 5.1.1), in the mid- to late 1980s, a man and his family ideally had to have a bicycle, a watch, and a sewing machine. However, by the turn of the century, homeownership and a car had taken the place of those commodities (Notar 2016). As such, gender norms where the man is constructed as the provider of material commodities, are enacted and reproduced in the context of marriage (Zavoretti 2016, 2019).

During the interviews, I noticed that aspects related to physical movement and embodied aspects were often highlighted when I asked, in a general manner, questions about why a car would be an important asset. In addition, when discussing how the interviewees had decided how to travel in their everyday lives, aspects such as comfort, time, and money were often highlighted. For example, Jia Hui was planning to study abroad and was thinking about getting a car after she returned to China. She did not have any specific car models in mind: “it doesn’t have to be very expensive, just a means of transport to take you somewhere. I focus on value for money.” At the same time, when discussing the importance of car ownership in specific social situations and life events, cultural norms and symbolic aspects were described

⁴⁵ In addition to material commodities, some of the interviewees also pointed out that for some parents, particularly those from Shanghai and Beijing, it was also important for their child that their future spouse had a local *hukou* (for further discussion, see Lui 2017; Y. Zhou 2019).

in detail. Therefore, it is important to understand car ownership not only as an artifact used for everyday travel but also tied to people's life situations and important life events.

Qiao Jiayu, a young woman who was working on her doctoral thesis, explicitly linked marriage and car ownership. When talking about how her commuting habits had changed after meeting her husband, she said:

To tell the truth, if he had not had a car, I would not have gone out on a date with him. That's true. At that time, he was not my type [...] and I think my life, the choices, and the space of my life expanded after I met him, since he had a car.

Thus, Qiao Jiayu communicated not only the importance of car ownership in the choice of a partner, but the fact that this, in turn, was tied to ideas of exploring. For her, having a husband with a car was very much related to the possibility of traveling and having new experiences. By having access to a car, ability to move around was expanded beyond her local downtown shopping in Sanlitun. Together with her husband, she could visit other cities and provinces for vacations.

Qiao Jiayu was quite frank about how important a car was in her decision to even go out with someone who might become her husband. However, this was not primarily related to the man's economic status. In Qiao Jiayu's case, access to a car had previously limited by vehicle restriction policies rather than by financial constraints. Therefore, marrying a Beijing *hukou* holder also offered the promise of car ownership.

The situation for Qiao Jiayu, for whom car ownership by the husband was more important than homeownership, represented the exception rather than the norm among the interviewees. In this manner, Jia Hui's case was more representative; while it was somewhat important to her that her future husband owned a car, it was much more important that he owned an apartment. She said: "the [family] apartment is for my brother, so I have nothing. So I had better find a boyfriend who has somewhere to live." She explained that she had gradually come to this realization and accepted her parents' opinion on what assets a potential husband should have.

While Jia Hui had come to agree with her parents, other interviewees positioned their views to be distinguished from their parents, or their parents' generation in general, perhaps pointing to social norms in transition. Wu Zhen, who was 29 years of age, told me that she was completely fine with the idea that her future husband did not own a car or an apartment;

rather, she laughed at the idea. Nevertheless, she admitted that her parents would not be supportive.

In addition, several of the interviewees drew explicitly on current norms compared to norms in smaller cities and villages when explaining their own opinions. Lin Shu from Liaoning argued that in bigger cities, the car was “just a transportation tool,” but in smaller cities and rural areas it was still an essential commodity in marriage. He laughingly noted that “if I wanted to marry a girl from my hometown, my parents would probably have to spend a lot of money to buy a car.” Thus, according to Lin Shu, in urban areas the car’s instrumental value was the central issue, while in rural areas it remained a symbolic artifact necessary for marriage.

From the empirical material, I derive that the symbolic importance of car ownership is mediated through practical obstacles. For example, Chai Guojiang noted that the practical circumstances in Beijing would often make it impossible for men or their parents to provide a car and an apartment before marriage. He added that while some young men would buy a car to attract women, most people did not want to waste time being stuck in Beijing traffic. Bian Di (ages 19 years) represented one of the young men about which Chai Guojiang was talking. Bian Di was working in Beijing for the summer to save up money before attending college in his home province, Gansu. Almost whispering, he said:

I want to have a car, so that is why I want to earn money now. Also, maybe I can borrow some money from my family, and then I can have a car when I start college, and then it will be easier to find a girlfriend.

While many of the interviewees understood that the social norms of car ownership varied between urban and rural areas, one interviewee, Zhang Yunlong, considered aspects such as income, apartment, and a car were important all over China. He complained about the list of requirements as follows:

If you are dating someone nowadays in China, they are going to go through all these questions. Or their parents are going to be curious [and ask questions such as] Do you own an apartment in Beijing or not? Do you have a car or not? ‘What kind of job do you have, [and what is] your monthly income? So I guess it is, like, one step, two step, into the marriage, in a way.

Zhang Yunlong also emphasized homeownership as most important as a guarantee for a certain standard of life. However, he added that, due to the housing prices in Beijing, being able to afford something, even in the suburbs, would be beyond his financial means. Worries similar to those of Zhang Yunlong, are reported by Zavoretti (2019), who observed that even

young men with promising job prospects worried about whether they would have the financial means to meet the necessary requirements to participate in the dating market.

Generally, access to a car was more important for people who did not plan to settle in Beijing or in other Tier 1 cities, but who were instead preparing to live in another province. The situation related to aspects such as restrictions on car ownership and public transport, and, as pointed out by several interviewees, the fact that the social importance of having a car varies within China. Migrant workers Zhang Yuan, Feng Minwen, and Luo Zijing worked long hours in Beijing to prepare their sons for marriage in their home towns. Luo Zijing noted that: “Right now, in the current society, you need a car [for marriage], but when I got married, you did not need to have a car but [to have] a motorbike, in addition to a house.” Thus, while some researchers, such as Notar (2016), have argued that the car has taken over for the bicycle as a part of the dowry, in some areas, this transition has also happened via motorized two-wheelers.

As already mentioned, providing a home and a car is impossible for many Chinese people without the help of their parents. Some consider the close financial relationship between generations is too close. Song Yifei even expressed that if the parents of a man help him too much with providing a house and a car, it might be a sign that he was too obedient to his parents or that the financial transaction would leave him obedient. She said: “we all are afraid of finding a mama’s boy!” Intergenerational dependence in home and car ownership in the context of marriage is still quite common across China (Zavoretti 2016, 2019). Thus, the quote from Song Yifei indicates the difficult line that young men have to tread between providing financial security and being seen as independent of their parents.

While the link between marriage and car ownership is tied to the importance of a car in family life, the car should not be reduced to a symbol of socioeconomic status, as exemplified by Wang Anan:

Once I saw a woman holding a very small baby on the metro, and I was thinking; if I had a baby, I would buy a car as soon as possible, I do not mind being squeezed on the metro, but if I have a baby, I would try my best to buy a car, even if it takes time, and sometimes it takes more time to drive, but that is safer for a child.

Zheng Xuan agreed that a car was a “must have” for family life. To be sure, it is relatively rare to see people with babies on the Beijing metro. As such, the uncomfortable, and thus embodied, aspects of traveling by metro can be tolerated by adults but the metro might be positioned as an unfit place for small children.

To summarize, while not all of the interviewees agreed that a car was a necessity for marriage, all interviewees related to social norms, either by distancing themselves from them or by subscribing to them in one way or another. Different views across generations indicate that there are changes around social norms on car ownership. Certainly, social norms relating to car ownership are thus certainly not set in stone. Instead, they are negotiated through the practical circumstances of owning and using a car in a certain location. It seems that these norms are only to a small extent driven by concerns for the environment or pollution, and similar findings have been made in other contexts (Hopkins and Stephenson 2016; Green et al. 2018). Rather, changes in the norms seem to be propelled by the difficulties relating to car ownership and the comparatively low convenience of car ownership in the city. Still, as revealed by several of the interviewees, including women with high education and economically independent, gender norms about financial responsibilities are reproduced through responsibility for housing and car ownership.

Marriage is one of the contexts for which cultural norms are most explicitly formulated. Still, there are also several other situations in which car ownership and use are noticed by members of a person's social network. In the next section I discuss the role of car ownership in other social relations and events, including professional settings.

7.6 Having and losing face: car ownership and situations of performance

Shared meanings relating to car ownership and use are apparent in day-to-day social situations, whether it regards a person's social standing among friends or family, acquaintances, or their ability to present themselves as a successful person in business relations.

When two friends, Wang Anan and Zheng Xuan, explained in their life situation, having a car would not be considered important among their peers. Nevertheless, they could see how important car ownership was for their parent's generation. To exemplify this, Zheng Xuan told me that when her family lived in Shanghai some years previously, her father had decided to buy a car instead of buying an apartment. As he was a businessman, being able to show that he was successful was important, so he chose to get a Mercedes-Benz over an apartment. Later, when looking back at how much the housing prices had increased in Shanghai, Zheng

Xuan considered this was not the best investment. She thought that the social pressure to have an impressive car had made her father make decisions that were bad for their family's economy. At the same time, getting a car, later on, would have been difficult since the present prices of successful winning bids in Shanghai's vehicle quota system were very high⁴⁶. Wang Anan and Zheng Xuan added that as they grew older, getting a car might become important if they were to work in business. Therefore, they did not really see the car decrease as a social signifier, only that it depended on what type of occupation they ended up having. Wang Anan stated:

I'm going to be a journalist, so I don't care about that [getting a car], but if I'm a businesswoman, I need to have a good car to show others that I'm earning a lot of money.

Zheng Xuan added, "It's like what our high school teacher used to say. 'If you don't work now, ten years from now, one of your classmates will drive a BMW or a Porsche, but you will [laughing] walk or cycle'." The stark contrast between driving, particularly driving a BMW, and cycling, that was expressed by Zheng Xuan's teacher echoed a much-debated quote from a Chinese dating show. In response to being asked to go on cycle trip, one of the contestants replied, "I would rather cry in a BMW." This episode has become an example in popular culture of the materialistic demands of young women in the dating market (Zavoretti 2019).

Chai Guojian commented on the different expectations of his own mother and his wife's mother. After working for some years in PR for an Internet company, he had recently started his own business. He stated:

For example, my mother-in-law wants us to have a very big car because they want us to have a baby, so the car should have enough space for three or four people, but my mother wants me to have a luxury vehicle. She says, "you are a man. You have to get business."

The quote captures differing expectations within generations and the car's ambiguous role as a status marker and tool for performing everyday functions. The quote also points to that different expectations of the former generation might also reflect norms in different parts of China, as Chai Guojian's family was from Inner Mongolia, while his wife's family were from Beijing.

Clearly, not only car ownership *per se*, but also brand and style can be highly important when it comes to social status. Chai Guojian added: "if you buy a very cheap Chinese brand, you

⁴⁶ In Shanghai, licences are not awarded by lottery, but solely through auctions. The average winning bid for a car license in Shanghai reached 92,000 yuan (12,810 USD) already in 2013 (S. Li 2018)

lose face.” He clarified that it would be better, in terms of saving face, to not have a car at all than to have a cheap Chinese brand. Chai Guojian considered that having a nice EV could be particularly good for attracting business, as such a car would show potential business partners that he was good at earning money and that he had a good mindset (i.e., that he cared about the environment). He explained the importance of car brands as follows:

When it’s Spring Festival, I will go back to my hometown, so if I get a very poor car, my family members will look down at me and worry about me. Maybe they will think I am not doing well in Beijing and that I need some help from them, so it’s a very complicated feeling. Maybe I made them upset, and I feel like I disappointed all my family members.

In a similar vein, in the context of Vietnam, Hansen (2016, 77) finds that a car “can be used to display urban success when returning to rural hometowns.” As such, such social norms are not only present in China but also found in other Asian countries.

Chai Guojian also drew on another social situation where the symbolic importance of cars comes to show, namely going to a party with one’s former classmates. He explained that this would be a typical situation in which people would compare car brands to assess one another’s status and success: “If you have a poor car, maybe next time they will not invite you to this kind of party, because you are useless, [and therefore]communicating with you would be a waste of time.” He added that an alternative would be not to have a car at all, as this might show confidence in not abiding by the norms. He further added that according to his understanding of young Beijingers, some groups were well off, yet still they did not feel the need to yearn for luxury watches and cars, and that there was a sort of status related to such attitudes.

By contrast, some interviewees disregarded the notion that arriving at meetings or social gatherings in a car was important. Some noted that often other people would not even see them arriving and therefore it hardly mattered whether or not they arrived by car. There was, however, some ambivalence towards such social norms. For example, Wan Zihan expressed that she disliked the association between status and good quality cars, as she argued that it does not say anything about the person themselves. However, if she were to attend a business meeting with some “powerful people,” she said she would still rent a car to avoid arriving by public transport. In other words, the norms can be hard to avoid in some social situations. Wu Zhen commented on the role of arriving in a car, albeit not necessarily one’s own car, as follows:

Previously we had a rule in our office that we were given a very low budget to visit the clients, so we took the metro, but my boss said it was not very appropriate. If our clients saw that we were taking the metro, they might wonder “is your budget that tight? What is wrong with your company?” So, we would have to take a taxi.

Furthermore, driving to meetings can be related to other social codes; in particular, dress codes might be difficult to navigate. For example, Li Junqi pointed out that since her work required a certain dress code, traveling by car was often the easier choice.

A future in which car ownership is less tied to social status was hoped for by some interviewees. Lin Shu imagined a future when the social importance of cars would disappear as shared cars became the norm: “A car can show something about your social or financial status, but I think in the future, all the cars will be shared. So, the car is just a means of transportation, nothing more, just getting from A to B, and everyone can drive a car.”

Based on the user interviews, I derive that car ownership remains important for showing urban success when visiting one’s rural hometown. Within urban China, the car also remains a token of success vis-a-vis potential business partners and within social networks. Therefore, in situations where ownership in itself is important for proving that one is not a failure in a highly competitive urban context. Although several interviewees disliked the symbolic connotations between economic success and car ownership, these norms appear hard to get around when push comes to show. As such, it is difficult to imagine a scenario in the near future where this symbolic connotation is untangled. However, there are also indications in my data material that there are situations in which ownership previously has played an important symbolic role but is increasingly challenged. This and the previous section underscored that we should not only consider everyday practices when trying to answer whether other forms of mobility can replace the private car. Rather, a variety of situations and “needs” to showcase success need to be taken into account.

7.7 Concluding remarks

In order to provide a better understanding of how platform mobility reconfigures urban transport, I shed light on the social meanings, embodied aspects, and mobility practices associated with car ownership. The overarching aim of this chapter is to understand to what

extent platform mobility shapes the understanding of private car ownership. I argue that the answer is “not too much.” This answer may seem like an oversimplification. Still, I derive that platform mobility is hardly the major threat to the automobility system in China. By expanding the discussion of mobility beyond moving between A and B, I show that platform mobility has a limited ability to challenge private car ownership.

Beijing has implemented both user and ownership restrictions on cars. There are also various barriers in the form of congestion, economic costs, parking spaces, and car maintenance. The combination of these factors appears to represent what Geels (2012) refers to as “cracks” in the system of automobility. On this background, I ask; *How have barriers to car ownership and use reconfigured ideas around car ownership?* Beijingers find themselves in a position where they need to reorient their expectations. Living in Beijing *and* having a car might just be too difficult, even for people who self-identify as middle class.

The vehicle quota system might appear alien and overly restrictive in Western eyes. However, my experience of interviewing residents in Beijing for this project and my M.phil in Guangzhou (Valler 2017) indicates that car ownership restrictions were a matter to be negotiated rather than something that sparked anger. Thus, acquiring a car could often feel like something that might be possible in the future through a tedious step-by-step process and often involves finding creative solutions. Somehow, car ownership appears to be understood as possible and impossible at the same time. While this may seem contradictory, it might make more sense when considering vehicle quotas through some parallels. Consider, for example, restrictions on the use of property, when and where one can buy alcohol, congestion charges, and waste disposal. The list is long. Yet, the point is that such restrictions may appear restrictive and utterly reasonable at the same time. Thinking along these lines positions vehicle quotas as less sensational and just how things are. At the same time, it certainly adds to the unpredictability of life, and the end result is that not everybody will acquire the right to buy a car. Regardless, the aspirations of car ownership, and ideas about how it may improve one’s quality of life, remain.

At the same time, I argue that barriers to car ownership shape the symbolic link between car ownership and freedom. Even the car in itself is not completely mobile. Several interviewees who lived and worked in Beijing, had left their car was left in another province, due to the car’s license plate. Thus, understandings of convenience and aspirations are mediated through local conditions. This highlights not only how the car is a material artifact that provides

freedom of movement or an inherently convenient transport technology, but also that such constructions are dependent on a range of sociotechnical configurations.

Public transport, bicycles, and e-bikes may cover everyday travel needs and wants in a faster and more predictable way than cars. Despite the hurdles of getting from A to B in a car, the embodied aspects of ownership can still play a role in the construction of the car. After long working hours, getting home in a comfortable manner might be more important than traveling the quickest way possible. Therefore, the car may also serve recreational purposes in everyday life. Further, the car offers promises of exploration beyond the city. Thus, by moving beyond Beijing, the car bears the symbolic connotation of freedom to explore.

The second sub-questioned in this thesis is; *How are links between car ownership and social situations (marriage and situations of performance) upheld and broken?* We might not only start to see the delineations of a middle class without a car but also the contours of a car paradox: why does car ownership remain an important aspiration despite the perceived inconvenience of the car itself? In an attempt to address this issue, everyday mobility practices in combination with life events are a fruitful starting point. The barriers to car ownership and use contribute to reinterpretations of the links between cars and the symbolic aspects of social situations. As such, “links are made and broken” (Shove, Pantzar, and Watson 2012, 36) between driving and other practices, including recreation, marriage, and work life. While the symbolic connections between car ownership, social status, and socio-economic stability are reconfigured, the links are not completely broken. This speaks to the importance of taking not only routine practices, such as commuting, into consideration but also social situations in which car ownership is “on display”. For example, the car is a means to show potential business partners that your business is thriving. Further, the car is a way to signal to a potential partner that you can provide economic stability. In this chapter, I have also highlighted that the importance of cars in finding a partner is connected to ideas of how family life should be organized.

At the same time, such norms are not set in stone, and several of the interviewees wished for a future in which car ownership was disconnected from a person’s abilities. The empirical findings reveal ambivalence towards norms, which might point to norms in transition.

Platform mobility might replace, and perhaps even add, some functions of the car as a transport tool. In other words, a car owner may use a dockless bicycle to avoid congestion during rush hour, or a person that uses the metro on weekdays may use the car for weekend

activities. However, platform mobility can hardly replace the car as a social marker or a part of rites of passage. Driving is also connected to different travel practices than public transport, platform mobility, and bicycles.

In the next chapter, I will continue to shed light on how platform mobility and driving a private car are connected to different practices, meanings, and embodied experiences. For example, I show that platform mobility reconfigures the use of taxis, public transport, and walking. The following chapter will also explore how demand for platform mobility can be understood as created, mobility justice implications, and the consequences of increased commercialization of mobility.

8. Platform Mobility and Everyday Life: Commercialization of Mobility on the Ground

Despite considerable hurdles, private car ownership remains an important aspiration among many Beijingers. The car is not necessarily important because it provides an effective way of getting around the city; other forms of mobility are often faster and more predictable. Rather, the car is tied to vacationing, positive embodied experiences, and denotes socio-economic security, co-shaped by various social situations. Taken together, Chapter 6 and this chapter provide an understanding of the use of private cars and platform mobility in tandem. Symbolic meanings, everyday practices, and embodied experiences differ considerably between the two modes of mobility. In addition to practices, Geels et al. (2017a) remind us to consider the role of markets in the sociotechnical systems of transport. As such, this chapter aims to understand the implications of market structures for users.

Platform mobility represents an intensified form of commercialization and commodification of mobility. Compared to public transport, increasing travel demand is fundamental to platform mobility as they are profit-driven and seek to attract venture capital. Moreover, not only is going from A to B commercialized, but also information about traveling is commercialized, such as in the form of credit ratings. These processes of commercialization have consequences for how platform mobility is domesticated and experienced in everyday life, and this has implications for how platform mobility is tied to other forms of commercialization in a network.

In this chapter, I focus less on the capitalistic workings of the companies and more on how intensified commercialization plays out from a user perspective. I base this chapter on the premise that different learning processes and user practices are needed to enact platform mobility compared to conventional transport technologies. Commercialization also has implications for who can access the services and on what premises. While acknowledging that platform mobility represents a continuation of preexisting transportation services, this chapter also recognizes the unique characteristics of the services and their implications for use. In contrast to the previous (Chapter 7) and following chapter (Chapter 9) that discuss car-based mobility, this chapter discusses both dockless bicycles and ride-hailing.

This chapter addresses RQ3: *How is platform mobility embedded into everyday life, and what implications does this process have for justice, safety, and constructions of gender?* Additionally, in this chapter, I specify the third research question by asking the following questions: *How can demand for platform mobility be understood to be created? How does the intense competition between the companies manifest on the ground, and how do users navigate its implications? How should use and non-use of platform mobility be understood?*

In this chapter, I organize the sections chronologically after changes in the platform mobility sector and these changes' implications for domestication. Before the empirical-based discussion, I present the rationale for studying the intersection of commercialization, mobility justice, and user perspectives (section 8.1). In doing so, I draw on existing literature that discusses digital divides in the transport sector and user studies on platform mobility in China and then identify gaps in the literature. I start the empirical discussion (section 8.2) by investigating how demand can be understood as created. In section 8.3, I look at enrollment of users from the perspective of pre-existing mobility practices, technologies, symbolic configurations, and positive embodied experiences. Furthermore, I investigate mobility justice implications of platform mobility in section 8.4. I then move to a discussion of aspects that might de-stabilize use. In section 8.5, I focus on dockless bicycles and shed light on the increasing material deterioration that has characterized the sector from 2016 to 2019. In light of these changes, I argue that considerable cognitive work was required to continue using dockless bicycles by the time I conducted field work. In the following section, 8.6, I show how users negotiate the volatile market through delegation to technology, particularly through apps that integrate several services into one interface. This integration of services has adverse consequences in the form of algorithmic control and social re-production, which I explore in section 8.7. Therefore, in this chapter, I follow the implications of changes in the platform mobility sector on the ground by looking at enrollment, domestication, de-stabilization, and re-stabilization of use.

8.1 Inlusiveness and use of platform mobility: perspectives from literature

Commodification and digitalization of mobility services give rise to important questions about inclusiveness (Pangbourne et al. 2018). Platform mobility, similar to other innovations with the potential to benefit society, tends to benefit those who are already resourceful (Banister 2019) (see also Chapter 2, Section 2.4). Platform mobility providers highlight that they contribute to society by providing transportation options that otherwise would not be available, and thereby provide more freedom (Pangbourne et al. 2020). However, within a “finite transport network” (Pangbourne et al. 2020, 42), mobility for some groups will inevitably have consequences for other groups. Thus, using user interviews, this chapter will shed light on the impact of platform mobility companies. By looking at such practices, it may be possible to uncover significant differences in access to the services and their inclusiveness. As argued by Smeds, Robin, and McArthur (2020) there is a need to go beyond quantitative transport data and reflect on people’s lived experiences in order to provide a fuller picture of mobility justice.

The literature on digital divides and digital inequalities originally focused on issues such as Internet coverage and access to devices such as smartphones, tablets, and computers (Van Deursen and Van Dijk 2019). As transport services have become increasingly digitalized, such divides have, in various ways, been carried over to access to mobility services (Sourbati and Behrendt 2021). Increasing digitalization in mobility has resulted in digital inequality, which has disproportionately affected older citizens (Durand et al. 2022, 32). At the same time, access to digitalized transport services is not just mediated by technical capabilities, devices, and Internet coverage (Banister 2019). We also need to consider meanings (cultural barriers, experiences, and preferences), materials, physical access, economic means, and competencies beyond digital skills.

Amongst the fast-growing body of literature on platform mobility in China (J.-W. Hu and Creutzig 2022), several academic articles and reports cover the use of the services (e.g. A. Fan, Chen, and Wan 2019; Gunarso 2023; H. (Hui) Jiang et al. 2020; Y. Sun 2018; B. Tang et al. 2020; S. Wang and Noland 2021). However, only a few contributors take a qualitative, sociotechnical approach (Flaaøyen 2019; J. (Jun) Zhang 2022). In this regard, Zhang’s study

of dockless bicycles in the Pearl River Delta⁴⁷ (J. (Jun) 2022) stands out. In a similar way to my approach, J. (Jun) Zhang (2022) understands dockless bicycles as an assemblage or configurations tied together in a sociotechnical system. Her study approaches dockless bicycles as a sociotechnical assemblage of technologies, capital, and infrastructure. Jun Zhang sheds light on how middle-class urban residents use dockless bicycles. Her study also positions the practice of using dockless bicycles in a historical context and shows how dockless bicycles have emerged in a setting in which much cycling infrastructure has disappeared. Importantly, Zhang’s study contributes a timely critique of dockless bicycles while refraining from demonizing the companies. I seek to contribute to this line of research by taking a broader empirical approach and include ride-hailing, and from a different urban environment in China. Starting from the next section, where I analyze the creation of demand, the discussions are based on my interviews.

8.2 Creating demand

The demand for mobility cannot be considered a fixed or constant entity. The amount of travel and the speed with which and means by which we travel are an outcome of complex sociotechnical processes. The outcome is generated by personal and social expectations, desires for a good life, and where we should be and at what time. It is also a product of political processes and spatial planning. In the following, I will discuss how demand for platform mobility can be interpreted as created, which contrasts an understanding that new transport technologies merely cover pre-existing transport needs. By examining demand as created, I include discussions of novelty and materiality, prices and promotional campaigns, social media, and planning of spatio-temporal mobility.

The uptake of dockless bicycles is closely tied to their materiality. In particular, the design and visibility of dockless bicycles play a role in attracting attention and interest. The appearance of orange, yellow, green, white, and blue bicycles across Beijing was enough to pique the curiosity of many interviewees, leading them to try out the bicycles when they were launched. As pointed out by Lin Shu, because they were so visible, or even “beautiful”, he

⁴⁷ The Pearl River Delta includes big cities in the southeast of the People's Republic of China and Hong Kong.

wanted to try them out when he first saw them. For many users, the first trips were made due to curiosity and not necessarily because they needed to go somewhere. Thus, the combination of being appealing to a large subset of the population (Christensen 2019) and visibility sparked curiosity.

Within a complex equation of mobility demand, there is also the commercialization of mobility. Ride-hailing and dockless bicycle companies have attracted large streams of venture capital, enabling companies to engage in harsh price competition, which has ultimately lowered prices. The capital streams have also enabled ride-hailing companies to recruit drivers through various price incentives and enabled dockless bicycle companies to supply significant numbers of bicycles.

Ride-hailing and dockless bicycle companies alike have used low prices to attract users (X. Guo and Gallo 2017). My interviewees frequently cited companies' promotional campaigns and price competition during the initial phase of their launch as motivating factors for experimenting with platform mobility. For example, Chai Guojiang made good use of refunds from Didi:

In the beginning, Didi gave money back to the clients. If you spent 20 yuan [2.8 USD], Didi would give you a 40 yuan [5.6 USD] coupon. So, in the first company I worked with, they would refund my travel expenses. So, for example, I took a receipt that said 40 yuan, but actually, I spent 20 yuan, and my company gave the money back to me [laughing], so I earned money by taking a taxi.

Several interviewees walked or used dockless bicycles interchangeably, which often was ascribed to low prices. Lin Shu, who lived in the city center, told me he would either walk or cycle, depending simply on what he felt like doing. He had bought a one-year subscription for 168 yuan (23.6 USD) for the use of a dockless bicycle service, and noted, "I think it is really cheap. Sometimes I ride [dockless] bicycles twice or three times a day, so I think it is good value for money."

Further, social media applications play a central role in promoting platform mobility processes due WeChat's importance in everyday life. In particular, WeChat has grown to become indispensable for everyday life (Plantin and De Seta 2019). It was evident in the interviews that ride-hailing and dockless bicycle companies are building on this indispensability in order to grow their user base. For instance, during an interview, Zheng Xuan took up her phone, started looking through her message history for WeChat, and noted: "When Uber and Didi were competing [...] they were sending me messages every day."

However, not only the companies themselves but also users of platform mobility used WeChat to recruit friends and acquaintances. Lin Shu stated:

You can share coupons with your friends over WeChat. So, I think this is an important reason why it grew fast. For example, I introduced Mobike to my friends. I think [it was] more than 20 people.

Such incentives facilitate the uptake of ride-hailing and dockless bicycles but may also contribute to creating expectations within social networks to use platform mobility.

Ride-hailing offers new opportunities for planning spatio-temporal mobility, which also contributes to creating demand. Although ride-hailing has many similarities with traditional taxis, it also offers users new opportunities. In particular, the possibility to preschedule rides with ride-hailing companies has made booking more predictable. Several interviewees expressed that this predictability provided an extra sense of convenience when planning their days; Li Junqi explained:

If I want to book a car, for example, for tomorrow, I can reserve it in advance, which is sometimes more convenient. I do not need to wait by the side of the road to try to stop a taxi. So, it is a lot about saving time.

This example also highlights how the rise in ride-hailing services created new expectations regarding the speed, convenience, and predictability of getting around the city. As the number of traditional, official taxis in Chinese megacities has not been able to keep up with the cities' growth, taxis can also be difficult to come by (Zhong and Yuan 2021), making ride-hailing a viable alternative and increasing the overall supply of riding services. Therefore, I argue that the opportunity for increased spatiotemporal mobility that platform mobility provides has influenced perceptions of mobility and shaped broader social expectations of spatiotemporal movement in fast-paced urban environments.

It is not only ride-hailing that is reshaping expectations of how fast and at what times one can move around the city. Several of the interviewees used dockless bicycles in combination with public transport to go either the "first" or "last mile". For some interviewees, using a dockless bicycle saved them time in their commute. In other cases, bicycles are used as the sole means of transport, especially for shorter distances.

Several observations from my fieldwork fit with the findings from research on ride-hailing, multimodal mobility, and dockless bicycles in China. First, a similar maximum travel length (2-5km) is reported in the literature on multimodal mobility (e.g., Martens 2004) and the use

of dockless bicycles in China (M. Du and Cheng 2018). Furthermore, dockless bicycles in China are predominantly used in combination with public transport (H. (Hui) Jiang et al. 2020; Y. Sun 2018). H. (Hui) Jiang et al. (2020, 20), whose study covered users and non-users in twelve large cities in China, found that over 80% of the respondents used dockless bicycles in combination with other transport modes. Furthermore, other contributions from the quantitative literature find that convenience and saving time are motivations for using dockless bicycles (H. (Hui) Jiang et al. 2020; Y. Sun 2018). In the case of ride-hailing, convenience and time-saving have also been found to be central to its uptake (Gunarso 2023; Tang et al. 2019). Furthermore, X. Guo and Gallo (2017, 185) argue that price competition of ride-hailing companies was important for initially starting to use the services. Moreover, a study conducted by Tang et al. (2019, 560) in China found that ride-hailing increases travel demand.

Ride-hailing companies argue that they can reduce congestion by optimizing travel time (Didi Chuxing 2017), and dockless bicycle companies assert that they replace car mileage with cycling (Mobike 2017). However, what is often forgotten in this discourse is that the introduction of “green” transport innovations may increase overall travel (Langbroek, Franklin, and Susilo 2017; Vivanco, Kemp, and van der Voet 2015; Chakravarty, Dasgupta, and Roy 2013). The examples from this section and existing quantitative research showcase how platform mobility can contribute to increased and more resource-intensive modes of mobility. For example, dockless bicycles are used to cover distances previously covered by walking. Compared with using traditional taxis, the increased convenience, supply, and predictability of ride-hailing, may also lower the bar for using these services. Later in this chapter (section 8.5), I discuss how users can grow disenchanted with the services. Interestingly, the convenience, inconvenience, predictability, unpredictability, and undersupply and oversupply all stem from the same market-steered processes. First, I discuss processes of enrollment.

8.3 Re-configuring pre-existing practices, technologies, and symbolic configurations

In this section, I demonstrate how platform mobility builds on mobility practices, domesticated technologies, and symbolic configurations. At the same time, the section also seeks to show how platform mobility also represents changes in these configurations. I also discuss how platform mobility is embodied, which is important to the understanding of stabilization.

8.3.1 Preexisting mobility practices and infrastructures

The embedding of platform mobility in everyday life should be understood in light of other travel practices that existed prior to platform mobility. Therefore, I understand already established travel practices as sociotechnical configurations that platform mobility further builds upon. I also explore the domestication of platform mobility through the practice dimension and look at the continuation and re-configuration of mobility practices. At the same time, platform mobility is used and made sense of in different ways from preexisting transport technologies. As shown by various studies of domestication processes, as technologies become a part of our lives, they often reproduce or transformation of existing activities (Ask and Sørensen 2019).

Several interviewees first became familiar with using dockless bicycles on university campuses. Before dockless bicycles appeared, using privately owned bicycles internally on Chinese campuses was commonplace. During my first trip to China, as an exchange student in 2012, bicycle parking outside campus dorms was overflowed with bicycles. The typical bicycle found on a Chinese campus is practical for moving around at campuses, which alternatively can include some walking time. These bicycles found on campuses and dockless ones have similar functionality and design (Mao et al. 2021) and match many of the same types of use patterns. In other words, the material aspects and the practice of using privately owned bikes and dockless bikes did not differ drastically. As dockless bicycle companies moved their operations beyond campuses, their embedding was aided by the existing bicycle and public transportation infrastructure.

Like dockless bicycles, ride-hailing should not be understood as a practice appearing in a vacuum. Before ride-hailing companies launched, taxis were an important part of Beijing's mobility system. When ride-hailing companies launched, they started by offering to book traditional taxis through the apps before launching their other services, bridging the transition from using taxis to ride-hailing. Among the interviewees, it was common to use these services interchangeably, which has also been found in quantitative studies on ride-hailing (B.Tang et al. 2020; Yu, Li, and Zue 2020). While ride-hailing may, to some extent, replace public transport, dockless bicycles might seem to stabilize the use of metro and bus systems. As such, neither dockless bicycles nor ride-hailing fundamentally change mobility practices. Although platform mobility companies generate demand for, in some cases, more resource-intensive ways of traveling, such services are hardly "disruptive." In the next section, I turn to how the domestication of platform mobility can be understood through the technologies that preceded them.

8.3.2 Digital payment and QR codes

Digital payment is a central enabler of platform mobility. Both dockless bicycle and ride-hailing companies rely on digital payment methods, specifically WeChat Pay and Alipay. These two giants in online payment provide technologies that users are already familiar with and use widely.

Several interviewees, such as Zhang Yunlong, pointed out that using Alipay or WeChat pay made dockless bicycles easy to use: "I can't remember the exact amount that you pay [deposit for Mobike], but I think it's around 300 yuan [42 USD], but it's very convenient, especially since you can use Alipay, the experience of using Mobike was great". This convenience is related to users being seamlessly transferred from platform mobility apps to digital payment apps. Thus, for the interviewees, paying for the services did not require installing or learning how to use new software.

In addition to digital payment, QR codes are a key component in the use of dockless bicycles. Each bicycle is equipped with a QR code that leads the user to an app when scanning through a smartphone camera. Prior to the launch of dockless bicycles in 2015, a considerable part of the population in China was familiar with digital payment and QR code technology (N. Jao 2018). In China at large, QR codes provided by Alipay and WePay have been central in bridging online and offline retail, as street vendors, restaurants, and stores widely use printed

QR codes for payment (Plantin and De Seta 2019). Thus, before the launch of dockless bicycles, QR codes were domesticated as a technology to buy a range of other goods and services. Due to the familiarity with QR codes from buying food, goods, and services, scanning a QR code appears, for many users, to be an intuitive way of accessing bicycles. Most interviewees understood how to “unlock” a bicycle without any prior instructions. QR code technology can thus be understood as gateways or a “sociotechnical component of strategic importance” (Plantin and De Seta 2019, 266) in the growth of digital platforms, also beyond mobility. In short, digital payment and QR codes have smoothed the transition and eased the learning process of platform mobility. Therefore, the cognitive aspect hardly posed any friction for the domestication of platform mobility.

Platform mobility can thus be understood as a sociotechnical system where its parts, such as QR codes and digital payment, have mutually stabilizing properties. On the one hand, platform mobility stabilizes digital payment and QR codes as platform mobility introduces new services for their use. On the other hand, as an embedded technology in contemporary China, digital payment and QR stabilize the use of platform mobility. In other words, as new technologies and services are interwoven into preexisting systems, the system as a whole is stabilized (Mayntz and Hughes 2019).

8.3.3 Symbolic configurations

As technologies are domesticated in society or individuals’ lives, they are situated symbolically (Sørensen 2006). Symbolic meanings can take a variety of forms; the new technologies can be altered symbolically from the ones that preceded them (Aune et al. 2016), or actors can understand the introduction of new technologies as a symbol of broader societal change (Suboticki and Sørensen 2020). In short, symbolic work is intrinsic to the enactment of technology. In the following section, I seek to tease out the re-shaping of the symbolic configurations of platform mobility and how several actors shape this process. Below, I explore how platform mobility draws on the history of cycling in China and high-end car culture.

Similarly to mobility practices, embedding platform mobility involves a continuation and re-configuration of symbolic configurations. Cycling has a nostalgic flare in the minds of many Chinese urbanities (Thomason 2021). Dockless bicycle companies are able to draw on the idea of reviving the “The Kingdom of Bicycles” (Inskeep and Kennedy 2017). Mobike, in

particular, has claimed to bring bicycles back to Chinese cities (Mobike 2017). However, as a technology that couples “old” transport technologies with the digital realm, dockless bicycles’ also represent something new. For example, Chai Guojiang did not only express amazement about the “newness” of the service but also that these were domestic companies.

Oh! [laughter] I can remember when they [dockless bicycles] first came. The fact that a Chinese company could run this type of service made everyone around me really amazed and surprised.

While Chinese car culture and marketing campaigns have centered around the idealization of Western culture (J. (Jun) Zhang 2019), I argue that dockless bicycles are positioned as modernity with Chinese characteristics. As such, the combination of “Chineseness” and innovation contributes to symbolically configuring them as something highly positive in many users’ eyes.

I further argue that the material configurations of high-end ride-hailing services can be analyzed in the context of Chinese elites. Didi Express vehicles vary in models and size, thus blending in with any other privately owned car. By contrast, vehicles used by the more expensive ride-hailing option, Shouqi Yueche (see Table 2, Section 2.3), are black with tinted windows and limited to a set of models. In addition, all the drivers are formally dressed and wear white gloves. There are parallels between vehicles used by high-ranking government officials and Shouqi Yueche. Traditionally, cars used by government agencies in China have been midsize or large black sedans, and Chinese car manufacturers have strived for this look to attract aspiring middle-class car owners (J. (Jun) Zhang 2019). In addition, the popularity of tinted windows is a way to imitate the cars of Chinese officials (Notar 2015). J. (Jun) Zhang (2019) argues that preference for these types of cars is strongest among people who grew up during the Maoist and Reform era, but also to some extent among young professionals such as lawyers and state employees (J. (Jun) Zhang 2019). In other words, the symbolic aspects of different ride-hailing services should not be understood independently of the understanding of class.

So far in this section, I have shown how platform mobility builds on, are embedded, and reconfigures established mobility practices, already domesticated technologies, and symbolic connotations attached to transport. As such, these aspects can be understood as sociotechnical configurations and as a part of domestication processes. At the same time, Cresswell (2010, 2016) highlights the need to understand how platform mobility is embodied, which will be explored in the following.

8.3.4 Enjoying platform mobility: embodied aspects

Above, I have shown how the commercialization of mobility can generate and reconfigure demand for mobility. Such changes in mobility practices may have negative impacts on congestion, pollution, public health, and other aspects related to people's well-being in cities. Much of the academic and public debate around dockless bicycles has centered around their contributions to sustainability and public health (e.g., Z. Chen, van Lierop, and Ettema 2022; H. (Hui) Jiang et al. 2020), but concerns about life quality are often less prevalent. However, in discussing the implications of commercialization of platform mobility from a user perspective, there is also a need to consider how platform mobility can positively contribute to everyday life. In urban China, many residents are pressed for time and work so-called "996" hours (9 am to 9 pm, six days a week). While platform mobility undoubtedly does not address the problem of the draining work culture at its roots, it certainly provides a highly welcomed relief. Therefore, in a comprehensive approach to mobility, we need to ask how mobility feels (Sheller 2004).

Cycling is not simply a means to an end but also meaningful in itself, as is often stressed in the human geography and mobilities literature (Aldred 2015; Spinney 2009; H. Xu, Yuan, and Li 2019). Cycling mobility can be an important way in which meaning is attributed to places and "create meaningful spatial relations" (Spinney 2006, 709). Wang Anan expressed such a sentiment:

These days I am riding a bicycle to different places, and I found some places I have never been. For me, it's not just a map in my mind, but a specific place or specific building, places that I have actually seen, like a memory of Beijing.

The quote thus shows the significance of exploring and place attachment related to cycling. In China, the bicycle's connotation of exploring, unwinding, and freedom is prevalent among enthusiastic hobby cyclists, as shown by Thomason (2021). However, from the interviews, it was clear that place attachment and positive embodied experiences are also experienced for commutes that include the use of dockless bicycles.

Wang Anan attributed the ability to see new places to the existence of dockless bicycles, as she explained that she would not have bought a bicycle even in the case that there were no dockless bicycles. In common with her, several other interviewees did not consider having their own bicycle as a viable option, which should be understood in the context of bicycle

theft, decreasing bicycle parking, and decreased maintenance services (as discussed in Chapter 5).

Further, several interviewees emphasized that cycling was a way to enjoy good weather and unwind, Jia Hui put it in the following manner:

When you are biking, you can enjoy the wind. When I was doing an internship, riding a bicycle from the company to my home took about one hour [...]. This was the easiest exercise for me to keep up [...]. Riding a bicycle is just a relaxing way to get home.

Several interviewees stressed the importance of seasons and weather and seasons in their mobility practices. While cycling is a way of enjoying good weather, using ride-hailing is a means of escaping bad weather. Chai Guojiang noted: “On rainy or snowy days, I prefer to take a taxi or use Didi. If I have plenty of time, I will take a taxi. If I want to save time, I will take the metro because it is faster.”. While deciding on a given transport mode certainly can be connected to spatiotemporal aspects, certain forms of mobility also offer an escape from too hot, humid, cold, or rainy days.

In addition, cycling was a way for some interviewees to escape the busiest stretches of the metro and avoid being packed tightly together in a crowd of strangers. Thus, cycling is not only connected to positive embodiments but also avoiding unpleasant situations.

Further, embodied aspects of different modes of mobility can contribute to a more pronounced distinction between work and leisure. For example, during the weekend, Zheng Xuan preferred to travel above ground. Taking the bus allowed her to see the city, compared to the sole blackness of the metro windows. Besides, she noted, “I go to the metro station every day, and I’m tired of it. Taking the metro feels like going to work”. While she preferred to take the bus, she would use a Didi when the waiting times or bus rides were too long. Therefore, while the metro might be the most efficient way to get around the city, other transport practices may offer alternative sensory experiences.

Technical configurations of platform mobility can also give a sense of accomplishment. Wang Anan said: “Mobike, the app, will count how many calories [you have burnt while cycling] and how much carbon you have saved, so it gives me a sense of achievement.” Mobike’s method of calculating carbon saved might be questionable (see Chapter 6, Section 6.3). However, regardless of the quality of Mobike’s quantification, they are nonetheless a tangible output. In this manner, coupling apps with cycling facilitates a type of “self-quantifying” (Dudhwala 2018) and a sense of achievement similar to personal fitness devices

such as FitBit's activity trackers. I, therefore, argue that the technical artifacts, beyond the vehicles, are also a part of how platform mobility makes the user feel.

Banister (2008) points out that conventional transport analysis often considers travel only as a cost. Based on my own empirical material, it seems apparent that dockless bicycles and ride-hailing have positively impacted the everyday lives of many urban dwellers in China. While commutes in Beijing can be tedious and time-consuming, there are also possibilities of finding some joy in these commutes. Thus, everyday enjoyment, such as cycling to the metro station in order to reduce exposure to some of the intense Beijing summer weather, should not be underestimated. When thinking about a transport system for the future, aspects such as experiencing the city, place attachment, and finding an enjoyable form of exercise should hardly be forgotten. The examples in this section serve as a reminder that the embodied aspects of mobility play an important role in everyday considerations. However, not all users are able to enjoy these positive benefits. In the next section, 8.4, I look at implications of the uneven embedding of platform mobility.

8.4 Locked in and locked out: Understanding use and non-use

Thus far, the chapter has explored processes of enrollment and embedding in everyday practices. However, the degree to which people have access to platform mobility varies considerably. For some, accessing the sociotechnical system is easy, yet it is harder to withdraw from it, while for others, prices and skills make the use of these services not accessible.

Ride-hailing apps provide convenience, but they can also create a form of dependence. The widespread use of apps for booking taxi services is making it difficult for users to opt out of using them, as described by Zhang Yunlong:

Didi is a very important app to have. You need it to book a taxi. Otherwise, if you just go on the street, it is super hard to get one. I mean, if you have not booked a taxi on Didi, the driver will just drive by, even though you are waving your hand and shouting "Hey I'm here!" because probably someone had booked it already, so it will just drive past.

Platform mobility is certainly not an exception regarding creating dependence; dominant mobility systems, particularly the automobility system (Urry 2004), have been found to have such effects. Living without certain technologies becomes challenging once a mobility system becomes encompassing and interwoven with other sociotechnical systems. What separates platform mobility from the automobility system based on privately owned cars is that it is not the car that creates such lock-in effects. Instead, the combination of the platform and the vehicle creates the lock-in effects.

For several interviewees, platform mobility was an important tool for managing spatiotemporal demands. As several of the interviewees were young professionals working in sectors such as journalism, consultancy, and academia, they had good incomes but were often short on time. Therefore, they had the economic means to use ride-hailing, but they also expressed that they had little choice not to. This illustrates how the feeling of app-dependence can be regarded as a class-based or lifestyle-related phenomenon.

As discussed in the chapter on theoretical perspectives, platform mobility can be understood through the concepts of *infrastructuralization* or *digital utility*. J. Y. Chen and Qiu (2019, 274) argue that “When apps become the mediator of rides, they constitute an underlying digital condition for transportation services because Chinese urban dwellers depend on them for taxi services. Analogous to electricity, these apps provide a new type of utility – a digital utility – in urban transport.” While this dependence might be practically manageable for some population groups, others might struggle to keep up with the changes. For example, in the Chinese app economy, age discrimination has been a widespread problem (Brancart 2018). Still, even for younger segments of the population, using ride-hailing can be problematic, particularly related to safety reasons. Several women felt that using Didi was unsafe after several incidences of high-profile gender-based violence and murder cases. Still, among the women I interviewed, all of them had continued to use Didi or had continued to use it after a shorter break. Many experienced that either they had little choice but to use Didi or that the sense of convenience was more important than feeling unsafe (for a fuller discussion on this topic, see Chapter 9). Wu Zhen, who was one such woman, said:

The number of these kinds of apps is limited in China, and Didi is the most common one. Right now, there are no other apps, or at least Didi is the better choice for you. In a way, it seems to be the only choice.

The points made by Wu Zhen shed light on the unequal outcome of platform mobility across population groups. For some, using ride-hailing platforms might be a more convenient form

of already established taxi-hailing practices. However, the use represents a sharp break for others, ultimately locking them out of taxi services or making them feel unsafe. The situation thus serves as a reminder not simply to regard the apps as convenient but also to ask for whom the apps provide convenience. While taxi booking prior to the launch of Didi's services was difficult in the past, due to the undersupply of taxis, the widespread use of apps has made booking taxis without apps increasingly futile. In other words, by providing a new service, the company also created a need that was not there some years ago and over time such services as become near inevitable for taxi services (J. Y. Chen and Qiu 2019) for some segments of the population. By becoming gatekeepers for transport technologies that one otherwise would not need such an intermediary to access. The case of platform mobility thus sheds light on how fast such mediators can create lockout effects.

While most interviewees felt that they had little choice but to use ride-hailing, the same pressure was certainly not experienced by all of them. J. (Jun) Zhang (2022) reminds us that the ability to opt in and out of a given transport mode is a privilege enjoyed by some more than others. For example, Chu Xiaoyan represented an exception to other interviewees in similar life situations and educational levels. She explained that she had taken the time to reflect on the app-driven Chinese society:

I think in some people's eyes, I might be weird, and they might wonder why I do not use convenient and modern stuff, like buying things online and why I choose to do something that will take more time and cost more [...] But I realized that it is not really necessary for me to follow the trend. Do I need to be like everyone? And in the end, I realized that I could choose, and I do like having this choice [...]. So, I told myself I do not need to follow everything that society tells me to do. Everyone is different, right? So I don't push myself to use an app because everyone uses it. I am in control!

She also reflected on issues surrounding her life situation, particularly living with her parents, which allowed her to eat home-cooked meals and shop in physical stores. She was well aware that not everybody had the freedom to make the same choices as her. At the same time, Chu Xiaoyan's account serves as an important reminder to nuance the idea of the locking-in mechanisms of ride-hailing services and other parts of the app-based economy. Opting out of much of the app economy had costs for her, but she preferred it that way.

So far, the discussion in this section has been on ride-hailing. While ride-hailing apps function as gatekeepers to riding services and produce lock-in effects, dockless bicycles do not produce such outcomes. For example, many interviewees only cycled when it was comfortable. People who have access to a car, afford taxi services, or have easy access to public transport view the use of dockless bicycles as an enjoyable and not strictly necessary

practice. By contrast, “cycling remains closely related to the productive lives of lower-class bicycle-sharing users” (J. (Jun) Zhang 2022, 723). An observation from Xia Zimeng (employee at Mobike, expert interviewee) also highlights this point. She explained that through heat maps and conversations with local stakeholders, Mobike found that low-skilled workers in the Shenzhen region rely on their dockless bicycles when returning home from late shifts in manufacturing.

Further, the aspect of class in the domestication of platform mobility is evident when considering the low-skilled migrants interviewed. However, among blue-collar workers I interviewed, dockless bicycles were not a part of their “productive lives,” as put by J. (Jun) Zhang 2022, (723). The non-use among this group of interviewees was related to the spatial distribution of dockless bicycles, everyday mobility needs, economic means, and skills.

First, Zhang Yuan and Feng Minwen lived in an urban village⁴⁸ on the outskirts of Beijing. The lack of dockless bicycles in their neighborhood was apparent when visiting them. In cities across China, dockless bicycles are concentrated in central business districts, downtown areas, and areas with relatively high housing prices (J. (Jun) Zhang 2022). Therefore, the spatial distribution of dockless bicycles is another way that platform mobility reproduces existing mobility divides. Such aspects are further reinforced by the fact that such urban villages often have very poor public transport coverage. For Zhang Yuan, this meant that she had a long walk to the bus, which often was stuck in traffic, and the closest metro station was so far away that taking the metro was out of the question.

Secondly, even in a scenario with plenty of dockless bicycles in Zhang Yuan’s neighborhood, she would not have used them because she did not know how to ride a bicycle. While cycling has been common in many rural areas in China, it is not the case in all parts of the country. Zhang Yuan explained that riding a bicycle was not that common in her hometown. Similarly, Y. Sun (2018) found that not knowing how to ride a bicycle is an important reason for not using dockless bicycles. It is thus important to remember the skill set required to use the dockless bicycle apps, which is not only limited to the use of the software.

⁴⁸ Urban villages can be found in many of China’s big cities. These are villages that used to be outside of cities, but as cities have grown, the city has enclosed them. For this reason, urban villages often have a different infrastructural makeup than the rest of the city, often with narrow lanes and one and two-story houses. In Beijing, as with other large cities in China, rural-urban migrants make up a considerable segment of their population due to lower rents than more central parts of the city.

Third, while ride-hailing was often portrayed as cheap by many interviewees, this was certainly not the case across the board. Again, drawing on Zhang Yuan and Feng Minwen, ride-hailing was out of the question for them and their family due to the price level.

Fourth, we need to consider the need for traveling around the city, in other words, spatio-temporal mobility. A good share of low-skilled migrant workers in the service industry in Beijing lives in dormitories, which relieves them of the need to commute to work. This was the case for Luo Zijing who had been working in a restaurant in the tourist district around the Forbidden City for five years. Since he worked 10-hour shifts six days a week, he did not travel around the city much, and he often spent his weekends doing chores or relaxing in the dormitory, meaning that his travel needs were quite limited. He would sometimes take recreational walks around the neighborhood but precisely preferred to walk rather than cycle for this recreational purpose.

The examples presented above in this section show how platform mobility is unevenly embedded in everyday life for different groups of people. This chapter stresses that the domestication of platform mobility should be understood through established mobility practices. However, when no relevant pre-established mobility practices exist, domestication met more friction. Furthermore, while generating demand for more resource-intensive ways of traveling is evident in the examples in Section 8.2, the examples in this section serve to nuance such understandings. In other words, even though the launch of ride-hailing has made many middle-class urbanities dependent on Didi and other mediators for rides (J. Y. Chen and Qiu 2019), the launch has not had a noteworthy impact on the lives of the blue-collar interviewees. As such, the blue-collar workers interviewed neither experienced social expectations to use these services. By contrast, Chu Xiaoyan found herself in a situation where people around her might see her choice to opt out of these services as odd. For this reason, she was pushed to take an active stance and carefully think through her reasoning for her choice.

8.5 Negotiating a volatile market: a continuous process of domestication

As discussed in section 8.3, platform mobility builds on technologies that most users were familiar with before the launch of the services, and domestication, therefore, required little cognitive work. However, when I conducted the bulk of interviews in 2019, the market had grown increasingly volatile, and the number of broken bicycles had increased. Therefore, continuing to use platform mobility, in contrast to starting to use the services around 2016, required that users continuously upgrade their knowledge to keep up with the changes in the industry. In this section, I shed light on how users negotiate the volatile market and the less positive embodied experiences of using dockless bicycles.

One way the volatile market impacts user experiences is rapid changes in which dockless bicycle providers have the best vehicle fleets (see Figure 17 and Figure 18). The number of low-quality and broken bicycles means that users actively have to make considerations when choosing a brand, illustrated by Chai Guojiang's considerations:

Mobike is my first choice for shared bicycles. The second choice is the blue and white bicycle provided by Didi [Qingju] [...] Mobike has good quality and is very safe. The blue bicycle [Bluegogo] is good too, but I often find the blue bicycles does not work because there are issues with, for example, the chain or the handle.

As bicycle fleets deteriorate, constant upgrading of one's knowledge of how to find a working bicycle is required. As such, domestication should be understood as a continuous process, where learning needs to keep up with quite rapid changes in the material configurations of the bicycles. When talking to Liu Mingyu in late July 2019, he noted:

I used to ride Ofo, but now Ofo is ... [laughing]. So, now I am choosing the blue one [Bluegogo], the blue one is new, it is easy to ride, and fast, faster than the yellow bicycles [Ofo], I think.

In this quote, Liu Mingyu's laughter expresses the problems experienced by Ofo, and them being on the brink of bankruptcy when I was doing my fieldwork. Many interviewees had given up using Ofo-bicycles and were trying to get their deposits back. While it was still possible to use and unlock Ofo bicycles in the summer of 2019, the maintenance work appeared to have come to a halt, and the company had stopped supplying new bicycles. In short, it was apparent to people that the quality of Ofo was, at best, subpar, to the extent that it even felt banal to ask about it. Ofo is just one—but perhaps the biggest—of many companies that have gone bankrupt. The example of Ofo shows how bicycle fleets suffer

from the companies' economic trouble and how a volatile business market can leave large amounts of unusable bicycles around the city.

Negative experiences with the quality of dockless bicycles have been well-documented in the quantitative literature on user experiences (H. (Hui) Jiang et al. (2020); Y. Lyu et al. 2021). The volatile market travels down to users' embodied experiences and the "feeling" of quality. Such experiences interplay with domestication processes, as rider experiences and cognitive work are intertwined. Because it is difficult to rely on the quality of a single company over a long period of time, users switch between companies as bicycle fleets are upgraded, and new companies emerge. Users are not domesticating bicycles provided by a single company. Instead, users domesticate dockless bicycles from several companies simultaneously or consecutively.

The continuous cognitive work required for domestication contrasts the promise of platform mobility to outsourcing maintenance work to professionals and non-human actors. Such processes have parallels to the domestication of other transport technologies. Historically, a major part of making the car available to a larger subset of the population was reducing the level of competence required to drive a car by delegating the work to both human and non-human actors (Shove, Pantzar, and Watson 2012). With the introduction of platform mobility, there has been an intensification of specialization where not even simple repairs (such as putting the bicycle chain back on or replacing an inner tube) are done by the users. Such work is either delegated to non-human actors, such as solid tires, or taken care of by the company by either repairing or simply replacing the bicycles. However, such delegation to humans (bicycle repairers) and non-humans (design) has not been completely successful. One has to be updated on which companies provide reliable bicycles to avoid unlocking broken bicycle after broken bicycle.



Figure 17: The challenge of selecting a functioning bicycle; from the right-hand side and up, Hello bike (blue and white), Ofo (yellow), and Mobike (orange and silver) (Dongcheng District, Beijing, June, 2019).



Figure 18: Updated models and bicycles added to the fleet; from front to back, Meituan Bike, the new bicycle model launched after Meituan bought Mobike (yellow), the latest model of Mobike before becoming a part of Meituan (orange and white), and Qingju (turquoise and white) operated by Didi (Chaoyang District, Beijing, August, 2019)

Some interviewees had even stopped using dockless bicycles altogether due to their low quality. In other words, the dockless bicycles were de-domesticated. For example, Wan Zihan had started using Ofo in her hometown Kunming just after they appeared on the streets, but later, when living in Beijing, she had stopped using dockless bicycles. She explained that this was related to both issues to do with quality and the risk of losing her deposit. She was particularly worried about the quality of the bicycles, since her fiancé had been involved in a bicycle accident, which she partly ascribed to the cheap material used in the construction of the dockless bicycles. While the business models and investments were important for drawing down prices and making it easy for people to start using the products, some had grown disenchanted with the idea of dockless bicycles. Others continued to use them, yet they were clearly disappointed about the recent turns in the industry.

Lack of predictability in finding either a working bicycle or any bicycle at all affects how dockless bicycles are integrated into everyday life. For example, Li Junqi would only take bicycles when she was not in a rush, as finding a properly functioning bicycle could take too long. While dockless bicycles are often described as convenient and time-saving in the literature (e.g., L.-Y. Qiu and He 2018), as well as by the interviewees, changes in bicycle fleets nuance this idea. Song Yifei was among the interviewees who had stopped using dockless bicycles, and she was quite critical of the way the companies operated:

There are a lot of broken bicycles. If they [dockless bicycle companies] really want to improve the customer's experience, they might need to think a little bit about how to maintain the bicycles, and make sure that they are available, usable and not all broken.

During my fieldwork, I was interested in finding out what role the presence of dockless bicycles played in people's decisions on where to live and how they planned for their commute in relation to the place of residence. In particular, I wanted to know whether dockless bicycles meant people accepted living further away from a metro station. Despite the vast numbers of bicycles, accessible ones can sometimes be hard to come by, particularly during rush hours at popular metro stations. This issue is often referred to as the "rebalancing problem," which means that despite a high number of bicycles in total, the bicycles are not necessarily at the right place at the right time (Cao, Prior, and Moutou 2021). Due to this unpredictability, dockless bicycles were not a part of the interviewee's consideration when planning where to live or work, as explained by Zheng Xuan:

When finding a place to live, I don't want to live more than 2 kilometers from the metro station. So, although I can ride a bicycle anywhere, what if I get off work really late and I want to rush back home? So, I will choose a place that is near the subway station because it will be safer. Sometimes you need to walk home, so I think that [location] really matters.

Therefore the spontaneity of use, as outlined in the discussion of how platform mobility is embodied, is partly related to the fact that dockless bicycles can be an unreliable means of transport. While none of the people I interviewed reported finding it acceptable to live far from the metro station due to the presence of dockless bicycles, Y. Sun (2018) argues that dockless bicycles have contributed to expanding the area where people use the metro for commuting. However, this assumption is based on big data analysis and surveys, which might not convey the insecurities associated with relying on dockless bicycles for getting to work on time or riding home at night.

In addition to damaged bicycles littering the streets, broken bicycles and bicycles belonging to bankrupt companies are piled together in so-called "bicycle graveyards" on the outskirts of cities (B. Haas 2017), of which Zheng Xuan was well aware:

What people are concerned about right now, for the shared bicycles, is also related to the environment and the waste of resources. I saw a picture taken by a drone that showed a parking lot filled with broken bicycles, and the companies who invented or built those bicycles are not willing to take responsibility. They just leave them there.

The stories about the number of broken bicycles appear in contrast to the praise that dockless bicycles have received for their contribution to solving environmental challenges (36Kr 2017).

There might, however, be signs of changes in how the industry operates in terms of providing fewer but more durable bicycles (a trend that had already started in 2019, see Figure 18). Cheng Yong, whom I interviewed online in 2022, mentioned:

I think the quality of the bicycles has changed quite dramatically compared to what we had before. Right now, the quality of the bicycle frame, brakes, and seats is much better. There has been a huge improvement in the quality of the bicycles.

Such developments should be understood in the context of stricter regulations on dockless bicycles, which control the size of each company's fleet (discussed in Chapter 6). Therefore, the amount of cognitive work involved in using dockless bicycles may again, be decreasing.

While some users had de-domesticated dockless bicycles due to the problems in the industry, many users continued to hail taxis and private vehicles despite mergers and bankruptcies. As there are strict requirements on cars used for ride-hailing, the harsh competition in the ride-hailing market does not have similar consequences for user experiences. At the same time,

the increasing number of providers for both dockless bicycles and ride-hailing services means that one has to consider which company to rely on. However, some of this work can be delegated to platforms, thus contributing to stabilizing user experiences. In the next section, I discuss the integration of ride-hailing and dockless bicycle services into other platforms.

8.6 Stabilization through integration: delegation to platforms

Earlier in this chapter (section 8.2), I have shown how social media apps are used to market platform mobility, and thus contribute to generating demand for it. However, social media and other more widely spread apps are increasingly used instead of the originals as single apps providing one or a few services are replaced with so-called “super apps”. For example, WeChat is not just used for enrolling users and spreading the word about ride-hailing and dockless bicycles, but it also enables unlocking of bicycles and hailing taxis through its Mini programs (H. Li et al. 2019). A WeChat Mini program is “a lightweight app relying on the WeChat client, which can be accessed directly from the search list without downloading and installing” (H. Li et al. 2019, 2753). Thus, as the number of apps has exploded in China, the use of the Mini programs frees up space on smartphones, contributing to enabling such a large app economy. Among the interviewees, WeChat was often used to unlock bicycles and order taxis and ride-hailing vehicles, as well as book trains and airline tickets for longer travel destinations.

In addition to the above-mentioned platforms, ride-hailing has also been integrated into one of the largest map service providers, Gaode (Yao et al. 2019). Through Gaode, users can choose between different ride-hailing providers for a given travel distance (see Figure 19). The integration with Gaode has simplified shopping around for different providers and made using alternatives to Didi easier. Many interviewees found Gaode very practical, and it was often among the apps that they reported using for traveling around the city. When I was doing fieldwork, most users felt heavily dependent on Didi, while some were moving over to using Gaode. Still, as Didi had the lion’s share of the market (Song, Liu, and Ma 2022), even if one relied on Gaode, the highest number of dispatched vehicles would be offered by Didi. As of May 2023, Gaode would often present Didi as the best choice for users (figure 19)



Figure 19. Screenshot from Gaode, which provides a number of different ride-hailing alternatives. Didi is shown as the top option offering the lowest price for this specific trip option. credit: Xing Manzheng, May, 2023

Gaode is not the only app that integrates several services within one interface. Companies such as Meituan, Alibaba, and Didi offer a range of different services within one app. In some cases, apps that started offering one service have expanded their business, such as the meal food delivery platform, Meituan. Such a process does not only apply to the mobility sector; for example, Douyin, the Chinese domestic version of Tik Tok, is no longer only a streaming and social media platform. Through its alignment with online shopping platforms such as Taobao, it now also offers shopping services, whereby users can buy the products promoted by different content creators (Z. Zhang 2021). While single service providers come and go, integration into super apps provides more stability for users.

Similar to QR codes and digital payment, the integration of platform mobility into super apps is a part of domesticating platform mobility as a part of everyday life. Moreover, it further

contributes to stabilizing the sociotechnical system of platform mobility and contributes to continued domestication. As such, with reference to the understanding of infrastructure by Star and Ruhleder (1996), we see that such super apps do not only support and isolated task.

Super apps also extends the range of data platform companies have access to (J. Y. Chen and Qiu 2019). Thus, the growth of super apps has caused increasing concerns related to data privacy (Ota et al. 2020). An increasingly detailed picture of people's life is revealed to such companies, which in turn, opens up new possibilities for increasingly detailed marketing. In contrast to less data-centered sociotechnical systems, such as the one presented by Geels (2017a), the mutual integration and stabilization of apps pose quite different challenges with regard to data privacy. In the next section, I continue to explore the role of data, but focus on how information sharing between users and between users and companies aims to shape user behavior.

8.7 The opaque dynamics of credit ratings

User data is a central part of platform mobility. One of the applications for this data is rating systems aimed at shaping user behavior. For instance, dockless bicycle companies use data to punish unwanted parking behavior and reward users who move bicycles from less accessible places to areas where they can more easily be used (Sun 2018). Ride-hailing companies as well seek to encourage wanted behaviors through credit systems (J. Y. Chen and Qiu 2019). User interviewee, Qiao Jiayu, understood the ratings as a part of larger changes within China:

It is like a two-way thing. It is not only that we comment on the driver or write a review of them, but they [the drivers] also rate us. [This is because] right now, China cares about credits a lot, so that is why they offer the opportunity to rate each other, and then it looks like the credit rating are connected to each other, also to Alibaba, Taobao, and so on.

Further, the credit ratings have a very low degree of transparency. One's credit rating is visible on, for example Alipay, yet it is difficult to know what makes the rating go up or down. However, on other platforms, such as Didi, one's rating is not even visible in the user interface. Therefore, while such systems may be aimed at shaping behavior, users struggle with knowing how to moderate their behavior to increase their rating. Qiao Jiayu continued:

You know, all these car [ride-hailing] platforms, they rate the clients. So, I am thinking that if I have a lot of trouble getting a car, it's maybe because my rating on those platforms is low, but I am not too sure about that.

As evident from this quote, it is challenging, or perhaps even impossible, to fully cognitively domesticate the credit rating of platform mobility.

I experienced this myself during my stay in China in 2019. My rating on Alipay was comparatively low, and I asked a friend why that was the case. She was unsure but assumed it was related to the fact that I did not use a big enough variety of services through the Alibaba app. When trying to rent an apartment through a platform company (Ziroom), I was informed through the app that my Ali-rating was too low. However, this problem disappeared after I had provided information about my education level, and I was subsequently accepted by the platform. These examples speak to the level of integration between platforms on the Chinese Internet and how sectors (such as housing, mobility, and shopping) are tightly intertwined.

Cheng Yong provided another example of how integration between apps may benefit some users economically. In addition, the integrated rating systems may function as an incentive for people to use a wider range of mobility services. Cheng Yong explained that he did not use dockless bicycles early on since they required a deposit. However, he became interested in trying a shared car service (vehicles that one drives oneself) called GoFun because they offered BMWs. In contrast to the time he considered trying Mobike, there was a quick way around paying the deposit to GoFun:

The thing that interested me the most about GoFun is that they collaborated with Alibaba, and Ant Credit score [an affiliate of the Alibaba Group]. So, you can use your credit score and you don't need to pay the 600 yuan [84 USD] deposit, so I decided to use this service.

Therefore, while credit ratings can be frustrating for some users, others see it as a possibility. It is important to mention that not all the interviewees used their credit ratings in a similarly active way or even checked their credit ratings regularly.

In Western media, this form of “credit society” is often understood as something from a dystopian future (e.g. Bruney 2018; Dockril 2018; Palin 2018). Such gloomy narratives have further been fueled by the fact that the private companies’ rating schemes have been mixed up with the state-organized social credit system (Donnelly 2021, NRK 2018). Therefore, it should be noted that credit systems offered by companies such as Alipay are not completely unlike those of Western credit institutions and Silicon Valley-based companies. Still, in China, the level of integration between platforms and the number of everyday services

performed through platforms are higher than most Western countries (K. Lee 2018), which implies that their effects should not be underestimated.

To summarize, by sharp contrast with the ease of learning how to book a ride or unlocking a bicycle, the opaque nature of the credit ratings makes them hard to navigate. Perhaps app providers even intend to make rating systems incomprehensible. As one does not know what parts of behavior should be modified to increase ratings, one might act according to assumptions of rewards in more respects than one is actually awarded for. Furthermore, Sheller (2018) reminds us that the language used in decision-making processes around mobility systems can increase alienation from such processes. In this instance, codes and reward mechanisms are impenetrable and are impossible for users – and maybe even coders – to fully understand. As such, these systems are ‘black-boxed’ (Latour 1987) – also in the term’s original “engineering” meaning. Resulting in a situation where we are delegating the work of creating trust to technology that we might not know the workings of. The next section will take a closer look at justice implications and access to platform mobility.

Rating and integration between apps have mobility justice implications both for users and drivers. While users and drivers alike are rated, J. Y. Chen and Qiu (2019) point out that drivers produce far more data than passengers and that they are subject to much stricter disciplining functions. Furthermore, their economic situation is, to a much larger extent, impacted by such systems. Therefore, justice is connected to the processes that mobility systems are shaped.

8.8 Concluding remarks

By looking at how platform mobility services are embedded in the existing mobility system and made sense of, I have sought to contribute to an understanding of their domestication in contemporary China. I seek to go beyond both doom and gloom paradigms (Lucas 2019) and consider exclusionary aspects and benefits to everyday life alike. I have approached platform mobility through how it has been made part of old and new sociotechnical configurations and how these configurations are enacted through user practices. As outlined in the introductory chapter (Chapter 1), platform mobility is often described as a phenomenon that has suddenly

appeared. Yet, a more nuanced picture is apparent when looking closer at how they are embedded and how they build upon other sociotechnical components, practices, and systems. In this manner, this chapter contributes to the literature that regards mobility technologies as an evolutionary continuation rather than revolutionary (Lyons, Hammond, and Mackay 2019).

In this chapter, I divide the third research question (*How is platform mobility embedded into everyday life, and what implications does this process have for justice, safety, and constructions of gender?*) into three sub-questions.

The first sub-question is; *How can demand for platform mobility be understood to be created?* In this chapter, I show how the bar has been lowered for using taxi services and first/last mile use of dockless bicycles, where the latter often replace walking. Marketing campaigns and price competition played an important role in trying out and using these services. Therefore, platform mobility is an example of how transport innovations may contribute to re-configuring expectations of how we should travel and at what speed. As such, social expectations are re-configured with the introduction of new solutions and devices. Moreover, the demand for platform mobility should be understood in terms the material configurations. In particular, in the instance of dockless bicycles, their mere presence and design contribute to curiosity. Drawing on Cresswell (2010, 2016), the chapter also discusses how platform mobility is embodied. While marketing and material configurations played an important role for users to try out platform mobility, positive embodied experiences or mundane categories, such as comfort (Hansen 2016; Shove 2003), are important for sustained use.

At the same time, the notion of comfort should be nuanced, particularly in the case of dockless bicycles. Harsh competition has the dual effect of bringing down prices and deteriorating the material aspects of the bicycles. Therefore, the material consequences of competition between companies are central in answering the question; *How does the intense competition between the companies manifest on the ground, and how do users navigate the implications of the competition?* Examples in this chapter illustrate that using several suppliers is necessary to stabilize domestication of dockless bicycles and that updating skills (cognitive dimension) in line with market developments is necessary to maintain and uphold domestication. However, not all users are willing to negotiate the volatile market, and we also see that some users de-domesticate dockless bicycles. The competition is easier to navigate in the case of ride-hailing services, as users can benefit from the price war between companies without the same consequences of material deterioration. However, as Didi has largely

become the dominant player among the ride-hailing companies, it is rather market concentration that poses a challenge to users.

Users are increasingly delegating some of the work in picking out the best providers to technology. In particular, super apps provide a more stable user experience and lower the risk of losing deposits. At the same time, these apps have ramifications for data privacy, market concentration, and intensified personalization of marketing. Further, credit ratings based on several app-based services are aimed at shaping behavior. The working of the credit ratings are opaque, they surely have justice implications within and beyond the mobility system.

Lastly, the chapter asked: *How should use and non-use of platform mobility be understood?* The convenience of ride-hailing reported by many interviewees is certainly not experienced similarly across the population. The seamless transfer from hailing a taxi on the street to using an app primarily applies to people who are already users of the app economy and can afford taxi services. The domestication of platform mobility should be understood as patterned, given that economic means, skills, spatial distribution, lifestyles, and everyday spatio-temporal demands influence active participation. Ride-hailing apps may function as infrastructure or as digital utilities (J. Y. Chen and Qiu 2019) for some people, while they become barriers to others. Hence, as argued by Star (1990, 43) argues that “A stabilized network is only stable for some, and that is for those who are members of the community of practice who form/use/maintain it.” Therefore, we witness a re-production of access to mobility as many of the same people who were locked out of taxi services, good public transport connections, and bicycles cannot reap the benefits of platform mobility.

While some groups maintain or continue to use platform mobility, they do so with a sense of unease. In the next chapter, I focus on ride-hailing and discuss understandings of safety and constructions of drivers and female passengers.

9. Self-Protection and Constructions of Passengers and Drivers: The Case of Ride-Hailing

By looking at the sociotechnical configurations of platform mobility in the preceding chapter (Chapter 8), I have sought to explain how platform mobility has been interwoven into everyday life. One of these sociotechnical configurations is travel practices and symbolic configurations. In this chapter, I analyze how representations about drivers, platforms, and vehicles shape mobility practices.

In this chapter, I argue that fear relating to the risk of gender-based violence in ride-hailing has shaped mobility and safety practices. In continuing to focus on how platform mobility is interwoven in everyday life, I examine in depth the presence of violence and gender-based harassment in the ride-hailing sector. While Chapter 8 discussed both the cases covered in this thesis, dockless bicycles and ride-hailing, this chapter solely looks at the latter. Both the previous chapter (Chapter 8) and this chapter (Chapter 9) address the third research question; *How is platform mobility embedded into everyday life, and what implications does this process have for justice, safety, and constructions of gender?* However, this chapter pays particular attention to the latter part of the research question taking ride-hailing as a case. In this chapter, I nuance the third research question by asking the following questions: *What are the implications of riding services being mediated through platforms, and how can constructions of drivers, users, platforms, and vehicles be understood? How do different actors attempt to make ride-hailing safe?*

I approach the topic of ride-hailing and gender relations in a two-fold manner. First, I consider how drivers and users in a constellation with apps and platforms are constructed with regard to safety. This discussion, covered in section 9.2, explores understandings of gender and how Didi has used the potential of finding a date in their promotional material. I also analyze how constructions of different drivers and services are connected to notions of trust. Second, I aim to shed light on strategies employed by different actors to solve the problem of safety. As a part of this, I look at the extent to which users trust technological solutions to do security work for them and what strategies women employ to enhance their sense of safety. However, before delving into the empirical discussion, I will address the data material that this chapter builds upon. In section 9.1, I revise previous research China's ride-

hailing sector and gendered aspects, as well as Didi's safety crisis, and identify gaps in the literature. I also outline the concepts and ideas specifically applied in this chapter which adds to the framework presented in Chapter 3.

Wherever I refer to "taxi"/"official taxi"/"official Beijing taxi," this implies booking through a platform, often Didi. I also stress the difference between using platforms to book traditional Beijing taxis and to book privately owned vehicles. Because being a passenger in private vehicles and traditional taxis are understood differently, it is important to distinguish the two.

This chapter is primarily based on interview material from people who used apps for taxi booking and hailing private vehicles on a regular basis. Thus, in contrast to the preceding chapter (Chapter 8), which both analyses use and non-use, this chapter only covers interview material from users of such services. This group of interviewees primarily consists of white-collar workers and students. While both male and female interviewees are covered in the chapter, the empirical material is primarily drawn from women's experiences.

9.1 Previous research and concepts

The issues of safety and ride-hailing have been investigated in a Chinese context previously by other researchers. In particular, the literature, based on survey and quantitative methods, has documented aspects related to users' sense of safety. L. Ma et al. (2019) found that physical risk was the most important factor in determining users' trust in drivers. They also found that trust in the drivers was interconnected with trust in the platform. Jing et al. (2021) found that perceived risk and safety affected people's intentions to use ride-hailing services. In contrast to findings from other countries, the survey by Y. Liu, Gao, and Rau (2022) revealed that Chinese users felt safer when using taxis compared to using ride-hailing services. Based on data from Nanchang, G. He et al. (2020) argue that the criminal cases have contributed to skewing the gender balance between male and female passengers even more than before the incidents. In addition to the literature covering safety perceptions among passengers, there are also valuable contributions from a Chinese context that look at drivers' experience from a qualitative perspective. Choi (2018) illustrates changes in the construction of masculinity in light of changes in the taxi sector in China. The study also delineates how taxi-reform shifts the power balance from drivers to passengers. Xing (2022) explores how

the temporal organization of ride-hailing challenges the forming of communities that can be found among taxi drivers. Nevertheless, to the best of my knowledge, research based on qualitative methods detailing constructions relating to self-protection practices and constructions of safety has not paid particular attention to a Chinese context in the English literature. Therefore, this chapter contributes to the understanding of how constructions of drivers are formed and what types of practices appear in the wake of such constructions.

Let us to the analytical concepts used in this chapter. I apply concepts and frameworks covered in Chapter 3, which includes perspectives from domestication theory, the mobilities turn, and the concept of ‘delegation.’ However, I also apply some concepts specifically to this chapter. I first delineate STS’ and mobilities studies’ understanding of ‘hybrids’ before moving to analytical categories from gender studies and then explain how I integrate these concepts within domestication theory and constellations of mobility. I review these three aspects below.

First, contributors to the mobilities turn have drawn on ideas from Haraway (2006) and Thrift (1996) to think of the car driver as a hybrid assemblage (Urry 2004, 2006; Dant 2004). This idea challenges us to understand the car as a part of human’s embodiment and to think of machines and humans as an entity. Sheller (2007, 178) further developed this idea and argued that changes to the car have taken place in the form of “driver–car–software hybrid”. Within a similar line of conceptualization, Anfinsen, Lagesen, and Ryghaug’s (2019) study of the domestication of EVs show how symbolic understandings of gender, vehicles, and drivers have performative effects on identity and driving practices. As such, technological modifications to vehicles do not ‘de-gender’ (Anfinsen, Lagesen, and Ryghaug 2019) vehicles but rather re-shape understandings of masculinity and femininity (Choi 2018, Weber and Kröger 2018). In this chapter, I take as a starting point that platforms, vehicles, and drivers/passengers should be understood as hybrids, where each part of the entity has symbolical implications on the hybrid as a whole.

Second, I draw on conceptualizations based on empirical research on harassment in public spaces and gender-based violence. In particular, I draw on ideas developed in gender research on strategies aimed at self-protection. The invisible work, or “embodied watchfulness” (Kelly 2017, xi) often done by women and girls to protect themselves from unsafe situations in public, has been conceptualized by Liz Kelly as “safety work” (Kelly 2017; Vera-Gray and Kelly 2020). In particular I understand the practices that women engage in as “invoking an absent protector” (1995, 206) and “strategies of Disguise” Madriz (1997, 129).

Third, this chapter also seeks to incorporate the concept of safety work into the analytical framing based on Cresswell (2010, 2016) and Sørensen (2006). In this line of thinking, safety work stems from the fear of dangerous situations (embodiment). It should also be regarded as conscious actions performed in given situations (cognitive) and becoming a part of people's habits and routines (practice).

9.2 Constructions of drivers, users, platforms, and vehicles

Issues concerning security and ride-hailing are prevalent in many countries (Scholl, Oviedo, and Sabogal 2021). At the same time, understandings of with whom one can safely get into a car inevitably have local characteristics and vary among people (Y. Liu, Gao, and Rau 2022). Below I will briefly cover background information about controversial criminal cases that have impacted notions of safety. While the first three sub-section (9.2.1, 9.2.2, and 9.2.3) are divided into a discussion of gender, drivers, vehicles, and services, I also stress that I these aspects should be understood in tandem (9.2.4).

Gender-based violence and ride-hailing have made waves on the Internet in China. In 2018, "Female Passenger Murdered by Didi Driver"⁴⁹ was the top trending hashtag on the social media platform Weibo (Koetse 2018). In the same year, a campaign called #DeleteDidi⁵⁰ spread online (Huang 2018a). The massive public anger followed two high-profile rape and murder cases associated with Hitch, Didi's carpooling service (Ye et al. 2019). On May 5, 2018, 21-year-old Li Mingzhu was raped and killed in Zhengzhou, allegedly by a driver (A. Zhang 2018). Didi later apologized for the murder, stating that its facial recognition mechanism was defective and it had not been able to identify the driver (L. Zhang and Shirouzu 2018). In August of the same year, 20-year-old Xiao Zhao was raped and stabbed to death by a driver (H. He 2018). It was reported that a friend of Xiao had tried to contact Didi to alert the company that Xiao was in danger, but that the company had not responded, which further fueled contempt for the company (Koetse 2018). While the two high-profile cases have very much shaped public opinion (Y. Liu, Gao, and Rau 2022), they were not the first to

⁴⁹ #Nühai cheng Didi shunfengche yuhai

⁵⁰ #Shanchu Didi

do so.⁵¹ Already in May 2016, Didi confirmed that one of its drivers was responsible for the killing of a female teacher named Zhong (Hua and Jing 2016). Furthermore, one year later, 30-year-old Ms Gan was molested and killed by a Didi Hitch driver in Chongqing. In addition to the above-described cases, there have been numerous accounts of sexual harassment by Didi drivers.⁵²

In the media, the murder victims have very much been constructed as ‘undeserving victims’; not doing anything to endanger themselves. There has been little to no widespread victim-blaming around these women. They were simply going on with their normal lives when attacked. For example, one of the victims was a young woman on her way home from work when she was attacked, another one was a young teacher, and yet another was attacked in the middle of the day. There is certainly something positive in the blame being ascribed to the predators and, in particular, Didi. Yet, the narrative around the cases might also communicate that attacks can happen to anyone at any time while still being relatively rare in such a large country. Therefore, the nature of the incidents might contribute to increased worry among women compared to an instance in which the female victims were constructed as engaging in potentially dangerous behavior. Therefore, while such understandings was not communicated directly by the interviewees, I argue that the high-profile murder cases have such an impact on understandings of mobility and safety because many women in their twenties and thirties can recognize themselves in the victims.

Many interviewees were more alert to potential dangers just after the 2018 stories broke. Nevertheless, their concerns lessened after some time had passed. For example, Song Yifei said: “Every time I take a taxi or a Didi, I feel nervous. I felt worse right after the accidents were reported, but after a while, it has been getting better.” Zheng Xuan stopped taking Didi cars for a while after the incidents, but for her, this was rather motivated by a (short-term) boycott:

I do not think Didi is doing the right thing because we all know that that girl reported problems before she was killed, but that Didi did not take it seriously. So, I was disappointed about what Didi did, and therefore I did not use Didi for about two months. But after some

⁵¹ There have also been similar cases with other platform companies. In February 2021, a young woman jumped out of a moving vehicle and died later of her injuries. She had rented the van and a driver from a moving company that operated as a ride-hailing company, where one could order on-demand moving services. While it was uncertain (as of February 23, 2021), what had caused her to jump, her family was suspicious about the death, since they claimed the driver had taken a different route than the one recommended by the app. The incident sparked anew the debate in China on how safe ride-hailing is for women in China (Feng 2021).

⁵² According to an incomplete study by the Chinese newspaper *Southern Weekly*, between 2014 and 2018, 53 female passengers accused Didi drivers of sexual assault and harassment (A. Zhang 2018).

time, I felt less critical of Didi, and I started to use [its services] again because they are quite convenient. We cannot deny that.

Thus, even though the #DeleteDidi campaign attracted a lot of attention online in China, it was not enough to cause the company to close down. While Zheng Xuan and others like her were very angry with the company, the convenience of using the biggest ride-hailing provider was just too important in daily life for many people. Jia Hui, who was in her early twenties, had a slightly different reaction: “I always think that the media are exaggerating reality, but I do not know. Maybe, I have a too relaxed view of how safe it is.” In other words, she had a sense that she ought to be more careful than she actually was.

9.2.1 Gender: Female passengers and male drivers

Women often find themselves with a male driver as men comprise the vast majority of taxi drivers (Choi 2018) and drivers for ride-hailing companies (Q. Lyu 2021). While the public outcry and criticism of Didi’s handling of the rape and murder cases had calmed down by the time of my fieldwork in 2019, the incidents had certainly not been erased from public memory. It was clear that the criminal cases continued to shape the female interviewees’ understanding of ride-hailing and taxis.

Several female and male interviewees articulated the sense of insecurity in a very gendered sense, in that women had more to worry about than men. Zhang Yunlong said: “I think it [the question of safety] is more relevant for girls because I am always thinking like ‘What are you going to do with me? I am just a man!’ [laughing].” In general, as with Zhang Yunlong, most of the men brushed off the issue as something they did not need to worry about.

Even though male drivers were seen as unsafe in terms of being potential harassers or predators, there was hardly a call for more female drivers among the interviewees. For example, Cao Yifan thought that men were generally better drivers than women. Therefore, despite the fact that male drivers could represent a potential danger, she did not favor a female driver who might be less safe in traffic.

Didi – the company itself – has even reinforced the gendered framing of its services, particularly in the case of its carpooling service, Hitch. Through promotional campaigns and statements from the company, Didi has tried to define Hitch as an alternative arena to taxis. When Didi first launched Hitch, it was promoted as a more social arena compared to its other services and a place to obtain new contacts for business or even for dating (E. Huang 2018a;

T. Wu 2019). The company also received feedback from people who have met through Hitch. During an expert interview, former Didi employee Cao Yifan said:

Didi will sometimes receive emails from users saying things like “me and [what would become my] my wife lived in the same *xiaoqu* [residential area], every day she ordered a *Shunfengche* [Hitch], we were going to the same place, and over time we got to know each other and then she became my girlfriend, so she does need to pay me anymore⁵³, and now we are getting married.” Sometimes such couples even invited us to their wedding!

Such feedback seems to fit well with the narrative that Didi tried to promote. However, after the murder cases, Didi was met with significant backlash for advertisements dating back several years, due to their clear sexual undertones (E. Huang 2018b). For example, the advertisements implied the possibility of giving attractive women free rides (for examples of advertisements, see Pingwest 2018). The company has since apologized for the earlier campaigns and explained them as part of hasty decisions made in a fiercely competitive environment (E. Huang 2018a). In 2016, the company went through its advertinments and removed those deemed “inappropriate.”

Furthermore, until 2018, the Hitch app had features that enabled drivers to comment on passengers and add tags as a part of their reviews, which were visible to other drivers. The comments and tags were sometimes of a highly sexualized nature (E. Huang 2018a). Tags such as “goddess,” “natural beauty,” “sweet looking,” and “long legged and hot as hell” are reported to have been used (Kuo 2018). It seems likely that interpretations of other Didi services (such as Express) have been colored by the explicit messaging of the Hitch campaigns. This is not to say that it otherwise would not have been a gendered space, but that it might have been reinforced. At the same time, security was not only understood by the interviewees in gendered terms, often expressed as male drivers as potential threats and female passengers as potential victims, but also very much interlinked with a perception of the home place from which the drivers had come. I will elaborate on this in the following section.

9.2.2 Drivers: Being and not being “local”

Formally, all ride-hailing drivers must hold a Beijing *hukou*, but the companies do not always comply with these regulations. Among the interviewees, there was a sense that the ride-hailing platforms had introduced a base of less controlled drivers. Different types of ride-hailing companies and services were also understood to supply different pools of drivers, who

⁵³ In this quote, the man in which Cao Yifan is talking about served as a Didi Hitch driver.

were seen as more or less trustworthy. Such notions were often tied to whether or not the drivers were from Beijing.

While some users preferred a local driver simply because it was presumed that they had better knowledge of routes, for others local drivers were preferred for safety reasons. For some interviewees, the connection between the driver not being “local” and risk was quite strong. Li Junqi, a young woman, was not comfortable with any type of Didi services, particularly their Express service, which she also associated with non-local drivers. For her, this was both related to being familiar with the city and a sense of trustworthiness, which she explained as follows:

You know, sometimes when you take Didi, the driver does not really know the way, and they are not local, and they will even sometimes ask you what way to go. That makes me feel like, “I am the passenger, so I assume that you know the way because I am not the one driving.” So, sometimes they give me a feeling of not really being trustworthy, and sometimes they do not really [...] I do not know. Maybe local people are more friendly or something.

While most Didi drivers were using GPS at the time when I did my fieldwork, not all drivers had used the technology during the first years of ride-hailing. Furthermore, a GPS device cannot always compensate for the lack of familiarity with a city. Therefore, Li Junqi preferred Shouqi Yueche, the more expensive option, which she understood as having local drivers with more training and being from Beijing.⁵⁴

Qiao Jiayu, a graduate student in her late twenties, told me that she had not used Didi Express for at least three years. Among the services offered by Didi (see Table 2 in Chapter 2, Section 2.3), Express is widely used and one of the cheaper options. Despite its popularity, Qiao Jiayu did not like using the service because she thought the drivers were too talkative and the cars were not clean enough. She added, “It might just be some sort of stereotype that I have of Express, but it is not very safe because the drivers are not from Beijing.” She preferred to book an official taxi through the Didi platform.

The importance of the driver being local is particularly interesting, since only three of the interviewees were from Beijing. In other words, on paper (in terms of *hukou* status) most of them were not local themselves. When interviewing Chai Guojiang from Inner Mongolia, I asked why it was important that the driver was local and he replied: “Chinese people always trust local people more. This may be discrimination, but it is true.” I felt I could push him

⁵⁴ Shouqi Yueche was “introduced by the state-owned enterprise Shouqi Group in Beijing”. (J. Chen and Soriano 2022, 55)

more on this point and pointed out that he was not from Beijing himself, to which he responded: “Yeah! Yeah! [laughing]. So, it is difficult to explain.” The reasons for the importance of having a local driver may be hard to put into words, yet it may indicate that “being local” might not just be about being from Beijing but about the time spent in the city, socioeconomic status, dialect, manner of speaking, acting, and so on.

While, negative stereotypes about Didi drivers often centered around the fact that they were not from Beijing, the interviewees also expressed dissatisfaction with drivers of official taxis. These stereotypes were usually related to politeness. For example, Song Yifei did not like the attitude of the taxi drivers and found them often slightly rude and therefore preferred to use Didi Express. Having a polite driver might certainly not be a bad thing in itself. However, it is timely to question why drivers might act in different ways. For example, people working for ride-hailing platforms are subject to stricter control of their behavior through app rating systems. For example, drivers working for Didi are reliant on good reviews to continue getting bookings (see also a problematization on the concept of peer-to-peer by Sandbukt 2021).

The idea of ride-hailing drivers as a less controlled, less vetted, and non-local pool of drivers may stem from previous lack of regulations, as well as from the companies’ varying ability or willingness to comply with regulations. While this is discussed in more detail in Chapter 6, it can be noted that in the early years, the ride-hailing companies were subject to few market entry regulations. Taxi companies were, at the time, in a different situation. Taxi companies, cars, and taxi drivers need to obtain licenses or permits from the transportation regulatory agencies at the county level. In order to do so, they need to meet fairly strict criteria regarding insurance, car repair, and driver examinations (Xing 2022). Still, while ride-hailing may be regulated a similar to hailing taxis today, it seems clear that they are not perceived as such. This might both be related to the previous regulatory vacuum, as described (see Chapter 6) or to the fact that ride-hailing companies routinely fail to meet standards set by authorities (van Wyk 2022). For example, fluctuations in the number of drivers working for ride-hailing companies seem to suggest that non-local *hukou* holders opt in and out of the platform according how strict regulations are enforced at a given time (X. Qiu 2019). Although Didi had already checked the driver’s ID, cars, driver’s license, and vehicle registration by 2018, at least three of the drivers who had accusations leveled at them had criminal records during checks.

While drivers' identity was often articulated by the interviewees as a dichotomy of being from Beijing or not. Different ride-hailing companies and services were also understood to supply different pools of drivers, who were seen as more or less trustworthy and again connected to their place of origin. Therefore, as I argue in this chapter, assessing both the platform and the driver plays into considerations of what types of cars one can safely ride in, which I will elaborate on below.

9.2.3 Vehicles and services

While a few interviewees clearly stated that they used the quickest and cheapest service, most of the women interviewees had quite strong opinions about what services they preferred. As already mentioned, most of the interviewees had some sort of categorization of who were or were not trustworthy drivers. However, these categories tended to vary to some extent between different people. Some interviewees distinguished between ride-hailing and taxis, others distinguished between Didi Express (*kuaiche*) and more expensive Didi options, and some distinguished between Didi and other service providers.

Ride-hailing vehicles often lack many of the symbolic artifacts that distinguish taxis from private vehicles. Taxis in Beijing and across China are highly recognizable vehicles that stand out from private vehicles. Not only do they have roof signs, but they also are found in a limited number of color combinations (see Figure 20). These features, which symbolically distinguish taxis may therefore evoke a sense of safety.



Figure 20. Readily recognizable Beijing taxis in Haidian District, Beijing, July, 2019

The ability to choose between different services is related to economic means. Qiao Jiayu's impression was that the Didi platform was almost reluctant to allocate official taxis, as she thought the company preferred people to use one of their ride-hailing services. Therefore, if she had difficulty getting an official taxi, she would use Didi Premier, Didi Lux, or a different ride-hailing company, Shouqi Yueche. At the time when we spoke, she could afford not only cheaper ride-hailing services but also the more expensive ride-hailing services that she regarded as the safest option. As Qiao Jiayu's economy had improved, she was able to make decisions relating to mobility platforms that she felt were safer. In a similar vein, Song Yifei told me she felt nervous whenever she took a taxi or Didi Express. However, she felt safer using Didi's Premium or Lux services because she had read that the drivers were in a more stable financial situation,⁵⁵ which made her feel more at ease. In other words, trust in drivers was connected to the type of Didi service drivers worked for and based on the economic status of the driver. Thus, feeling secure when moving around the city and economic means can be tightly interconnected.

⁵⁵ Didi's Premium service requires that the car used are valued at 150,000 yuan (20,878 USD) or more, and drivers are requested to have a unified dress code and to provide water, umbrellas, paper towels, and so forth for the passengers (T. Wu 2019, 8).

For some of the interviewees, notions about when, where, and how to travel were not only shaped by the controversial criminal cases but also by their own experiences. When I asked Wan Zihan whether she felt safe in either taxis or “Didis,” she answered as follows:

In taxis, I feel safer, but with Didi, I feel less safe because I remember that in Kunming once, it was very late, and I took a car from Didi but, I did not know if was not sure whether the driver was a good man or a bad man or if he had some particular purpose or not.

Wan Zihan further explained that she preferred to take a taxi, particularly when going somewhere late at night. During the daytime, her choice was also mediated by the price of different services, but when it was late, the aspect of security was more important than the price.

Interestingly, the idea that official taxis are safer may even ring true for the drivers themselves, as Jia Hui told me about an encounter with a Didi Express driver when she was going home from work at 9 p.m. She said that the Didi driver acted as though he was her father, criticizing her for taking a Didi in the evening. She said: “He [the driver] kept blaming me, saying ‘You have to call an official taxi at night. You are a girl’,” and he blamed me the whole way to my home, and I acted like his kid and being like ‘I’m sorry’.” When I asked her about how the situation made her feel, she said that it actually made her feel good or “warm.” The quote thus indicates how widely spread notions of ride-hailing as unsafe are, particularly for young women at particular times of the day. It also points to the fact that understandings of security are reproduced from within the ride-hailing services. Furthermore, the above quote is illustrative of the construction of women as potential victims, especially when moving around the city at particular times of the day. Thus safety is tightly intertwined with spatio-temporal mobility.

In the case of ride-hailing companies, it has been central for them to market themselves as a safe option and Didi has not been an exception in this respect. Some ride-hailing companies even claim that their checking procedures are as strict or stricter than those of companies running conventional taxi services. While the checking procedure is designed to make passengers trust their drivers, it seems that the “traditional” way of recruiting drivers earns more trust (see also Y. Liu, Gao, and Rau 2022 for a discussion on understandings of safety). However, while the measures are intended to increase passenger security, they also enhance the reputation-based system and exclude a number of people from serving as drivers (X. Wang 2020). For example, procedures include checking the national ID cards of people with criminal records and checking their name against a list of “dishonest” individuals on the

website of the Supreme People's Court (X. Wang 2020). These measures came in addition to preexisting forms of algorithmic control, whereby drivers with the best ratings, the fastest pick-up times, and relatively low levels of declining numbers of trips had a higher chance of being assigned more business through the app (H. (Huiqin) Jiang and Wang 2020).

In sum, while taking a conventional taxi or using more expensive ride-hailing services was often associated with greater predictability, Didi Express drivers were seen as somewhat of a “wild card.” In the following section, I will elaborate one how gender

9.2.4. The entanglement of gender, drivers, and services

As I have shown, trust in a driver is negotiated through trust in the mobility platforms' ability to vet drivers. The intersection of being a man, driving for a seemingly unregulated platform, and not being from the city seems to pose a risk. While most of the interviewees were not local themselves, they were often university-educated and working in office jobs. This may suggest that it is not only coming outside Beijing that poses a risk, but also having a low-skilled job, which in combination poses a risk. As one of the women interviewed pointed out, having drivers that she perceived were in a relatively better financial situation made her feel more at ease. This is not to underplay the persistence of gender-based violence but rather to show that the stereotypes of potential abusers complicate the issue.

Further, Didi has engaged quite explicitly in constructing its services as a gendered and even sexualized space. Through its advertisements, gender stereotypes have been reinforced and there are hints that male drivers might even provide free taxi services to women they find attractive. While users are engaging in various safety practices and even trying to moderate their behavior by limiting how much they talk to the drivers, the company has been sending quite the opposite message. Within this gendered and even sexualized space, women are telling themselves, and are being told, to be modest and not to expose themselves to danger. In the next section (9.3), I explore how users negotiate the insecurities of using ride-hailing services. In section 9.3, I also discuss how Didi has tried to delegate safety work by launching a number of technical fixes to ease users' worry about being victimized.

9.3 Self-protection strategies

As discussed in the preceding chapter (Chapter 8), ride-hailing is often experienced as a nearly unavoidable part of daily life for people who identify themselves as middle class. However, ride-hailing is also seen as a somewhat risky form of mobility. To negotiate these seemingly opposing aspects, the interviewees employed different self-protection practices, which will be explored in section 9.3.1. Didi has also launched a number of technical solutions as a response to the security crisis, and the following section, 9.3.2, will analyze how users relate to these solutions and how they employ other forms of technology to ensure their safety.

9.3.1 Moving around: time and space

Limiting spatio-temporal mobility is one way in which safety work plays out. In particular, the interviewees made considerations when moving around at night and whether they should even travel around the city late at night at all. However, limiting spatio-temporal mobility is not only an act of self-restraint but also, in part, mandated by Didi. Both of these aspects will be explored below.

For some women, the criminal cases signaled that they should be more careful. Chu Xiaoyan expressed that she was shocked at first when the news broke about the murder cases, but she also felt happy that they had been reported:

I think it is a good thing that that story is reported because everyone knows that [these things happen], and it tells the girls to be careful [...] Also, I think for me, it is a reminder not to go outside [when it is] too late, and even if I go out and take the taxi back, I need to be careful.

It seems that the incidents have had some disciplining effects. While the dominant narrative of the murderer cases has been that Didi as a company has acted irresponsibly. Another takeaway has been that women need to be more careful and just not put themselves in such situations in the first place—an approach that even Didi has supported, albeit highly controversially. In June 2018, after reopening the Hitch app after a temporary break in the service, Didi announced that Hitch drivers could only pick up passengers of the same sex in the early morning and late evening (L. Zhang and Shirouzu 2018). The following year, Didi announced that Didi Hitch would have shorter operating hours for women. However, the

measure was quickly rolled back after massive criticism was leveled at Didi for being discriminatory (H. (Huiqin) Jiang and Wang 2020).

In addition to the main actors, namely the company, users, and authorities, aiming to enhance safety with regard to Didi, the media can be regarded as an actor. In 2018, China's state-owned broadcaster, CCTV (China Central Television), published a digital brochure with safety advice for women traveling alone. The advice included not talking too much with the driver and not taking a taxi late at night or to remote places (Kuo 2018; Sohu 2018), both of which were echoed among the interviewees. Thus, in the discourse on gender-based violence in the ride-hailing industry, removing oneself from potentially dangerous situations has been a suggested measure. While such advice is not uncommon in contexts beyond ride-hailing, it has often been heavily criticized as a form of victim blaming or for not attributing the responsibility appropriately. Therefore, while the news reporting on the criminal cases has not been characterized by victim blaming, it seems that media-issued advice has communicated that women have a responsibility to take part in ensuring their own safety.

Women are being told and telling themselves that they need to consider when and how to travel. For example, traveling alone late in the evening, especially in remote areas, is constructed as irresponsible both by users and other actors. Thus, while ride-hailing apps have gained infrastructural properties, and their connection to everyday functions has made them nearly ubiquitous (J. Y. Chen and Qiu 2019; Plantin and De Seta 2019), they are constructed as unsafe at specific times and in specific places. Star (1999) reminds us that one person's infrastructure can be another person's difficulty. However, in this case, the same assemblage of technologies can be a reliable transport technology during the daytime but represent a difficulty at other times for the same person. In other words, it is only a stabilized network (Star 1990) in given time-spaces. In order to navigate these insecurities, women are employing various strategies to enhance their feeling of safety. While these are often seen as particularly important when traveling at night, other circumstances prompt the employment of various security practices. In the next subsection I take a closer look at these strategies.

9.3.2 Delegating protection to technology?

Through increasingly stringent procedures for vetting drivers and technological fixes, Didi has tried to assure its users that its services are safe (Didi Global n.d.). Didi launched multiple security checks, including the possibility of sharing trip itineraries with other people, a panic

button, protection of phone numbers, picture authentication, and audio recordings⁵⁶ (Didi Global n.d.; *Global Times* 2018b; A. Zhang 2018). These measures came in addition to the above-mentioned facial recognition mechanism to which drivers are subject. In other words, Didi has asked its users to trust the built-in technological features to perform security work for it.

In addition, the government was pushed to make new regulations for the industry in light of the incidences in which women were attacked or murdered (Jiang and Wang 2020; Ye et al. 2019). The official stance has been that ride-hailing companies should take responsibility for protecting their passengers (Xinhua 2016c). In other words, they cannot argue that their role is simply connecting passengers and drivers. Furthermore, through regulations of the ride-hailing sector, state-mandated technological fixes have been prescribed. The government departments that oversee the ride-hailing companies are obliged to keep credit records of both drivers and companies, and to incorporate that information into the national platform on credit information (Ministry of Transport of the People's Republic of China 2016b; 2022b).

However, despite the above-mentioned measures, many users continued to employ various security strategies. While some employ such strategies as a default, for others the strategies are context-dependent. Furthermore, while some of the interviewees relied partly on technological solutions to assist them, they did not completely rely on the inbuilt features to perform the task solely. These observations echo earlier observations by Y. Liu, Gao, and Rau (2022, 263), who state: "Chinese users have a low level of trust in security measures provided by ride-hailing platforms, such as driver identification and trip trackability."

A practice familiar to many young women was to make a phone call or to send a voice message to a friend or family member. Such calls are often done primarily to make the driver aware or think that somebody is either waiting for the passenger or knows where they are. Li Junqi gave the following explanation:

When I get in a taxi, especially in a Didi [private vehicle], if the driver does not seem very trustworthy, I might call my friend or send a voice message saying, "I will be someplace in maybe 30 minutes. Can you wait there for me?" So, I will let that driver know I have someone to pick me up, so it is not just me alone. I think then he would not dare to do something to me, so I always do this when I go out, especially at night [...] I just want him [the driver] to hear that I am saying this to my friend.

While a few interviewees made such calls consistently, some made them based on whether or not they perceived the driver as trustworthy. The strategy resembles what Gardner (1995, 206)

⁵⁶ The audio recordings sparked debates over privacy concerns as passengers had to accept audio recordings through the driver's phone (*Global Times* 2018b).

calls “invoking an absent protector,” meaning that being accompanied or giving the impression that someone, may be a parent or a friend, who knows where the passenger is provides a sense of safety for that passenger.

By comparison, Wang Anan was not comfortable with calling or sending people voice messages in the car. She noted, “I think if you do this, it seems like you do not trust the driver, and it will sometimes seem kind of insulting or offensive.” Instead, she preferred a more discrete method, which was to send a screenshot with the driver’s information to a friend and let them know when she would return home. In this manner, she avoided running the risk of insulting the driver. Her friend, Zheng Xuan, had a similar strategy. She took a photo of the license plate and sent it to a friend before getting in the car.

Some interviewees also used the Didi app or map apps as an additional security device to track whether the taxi was going in the right direction. The Didi app also has the function to track the passenger’s position automatically and to share this information with a trusted contact (Didi Global n.d.). This feature made Wang Anan feel safer using a private vehicle hailed through Didi than a traditional Beijing taxi. Her opinion in this regard contrasted with that of most other women I spoke to as well as with the findings made by Y. Liu, Gao, and Rau (2022). Nevertheless, while Didi’s built-in features eased Wang Anan’s worries, she did not wholly delegate the security work to the technological functions.

Another common strategy was to check that the information about the vehicle, such as the registration number, corresponded with the information accessed via the app. If it did not, it might imply that a driver was using another person’s profile. In one of the murder cases, the accused had used a profile that did not belong to him (Russell 2018).

Zhang Yunlong, one of the male user interviewees, told me he used the information in the app in a somewhat different way to enhance his feeling of safety:

In the app, there is a picture of the driver [...] I always look at that. If I feel comfortable, then I will just take it [the ride], [but] if the driver looks crazy or something, I will probably not [laughing].

Thus, for some interviewees, the app is a central device for evaluations of who could be trusted start before even got into a car.

As already mentioned, Didi provides a panic button in the app. Once, Li Junqi had pressed the button unintentionally:

I accidentally pressed the ‘call police’ button. But it [the button] does not really call the police. It sends an SOS message to all emergency contacts that I have in the app. So, my parents and my boyfriend got the message.

As a result, she got worried text messages asking her how she was. While the panic button is accompanied by the text “one click to call the police,” one has to click again to actually call the police, and therefore the panic button has been criticized for being misleading (B. Hu 2018). However, despite Li Junqi’s initial surprise, the experience made her more at ease. “It’s quite immediate. It is like they will know my location and also the information about the driver. So, yeah, it assured me or ‘overassured’ me.” In other words, her experience with using the app made her more confident about the security functions.

Song Yifei used a number of the same strategies as the other interviewees, such as paying attention to the GPS, texting friends, and always making sure to sit in the backseat. However, she also mentioned she had changed her nickname in the app to a more masculine-sounding name. By doing so, she attempted to avoid drivers who preferred female passengers. While she was the only interviewee who told me about changing her name, it was not uncommon for women in China to change their listed gender and profile photo in the aftermath of the murder in May 2018 (Kuo 2018). Madriz (1997, 129) conceptualizes the strategy of altering one’s clothes to not attract attention as one of the “strategies of Disguise.” While none of the women I spoke to mentioned that they altered the way they dressed, changing one’s name in the app can be a form of digital disguise. Thus, rather than dressing to appear more “masculine,” passengers attempt to appearing so even before the physical encounter takes place.

One central point in STS is that humans delegate work to non-human actors. However, this does not always happen without complications, and the material objects do not always behave as we intend (Johnson 1988; Latour 1992). In the case of Didi, users are asked to trust the app’s built-in features (Didi Global n.d.). However, the uptake of these features is low (X. Wang 2020), and instead the interviewees applied a number of parallel strategies to feel safer. Didi itself has even blamed failing technology for security breaches (L. Zhang and Shirouzu 2018). Thus, it might be a “big ask” for users to put their safety fully in hands of the technology’s features. While some interviewees had confidence in some of the features, most of the interviewees relied on functions that were technological but not entirely as the company intended for them to be used, such as evaluating driver’s profiles or using alternative map apps to track the route. In other words, instead of completely relying on these built-in features, the users continued to monitor the situation in various ways. In this case,

therefore may be a form of partial delegation rather than fully putting the task in the hands of technology. Alternatively, this process can be conceptualized as a domestication process in which users make the technology their own, but the way in which they do so seem to conflict with the script of the technology.

9.4 Concluding remarks

The first sub-question I have addressed in this chapter is: *What are the implications of riding services being mediated through platforms, and how can constructions of drivers, users, platforms, and vehicles be understood?* There is no doubt that high-profile murder cases have had a major impact on such constructions. At the same time, the cases have been co-constructed with users' past experiences, gender, notions of drivers' place origin, and company's control of the driver pool.

The analysis in this chapter highlights that it is not the driver, platform, or taxi/non-taxi vehicle (the vehicle) in isolation that is central for the understanding of safety, but rather it is the constellation that shapes constructions of safety. As presented at the beginning of this chapter, I draw on the concept of hybrids from the mobilities turn. Specifically, Sheller's (2007,178) understanding of driver-car-software hybrids. However, in the case of ride-hailing, I argue that it is not only the "computing, surveillance and code-sorting" (Sheller 2007, 178) that is central to such constellations, but also shared representations about the companies that provide platform mobility services. In particular, Didi's ability to ensure passenger safety.

In a vehicle-driver-platform constellation, constructions of safety are co-produced between the different elements—vehicle, driver, and platform. For example, the material and shared representation of an official Beijing taxi compared to non-taxi vehicle used for ride-hailing might be quite different, and where physical symbols underplay safety constructions. The distinction between a recognizable Beijing taxi with a roof sign and other vehicles may communicate very different things. While the former is often associated with vetted, trained drivers who are familiar with the city, the latter may be linked with ideas of not properly supervised "others." Another interesting aspect that highlights how constructions of vehicle-

driver-platform constellation is that many drivers switch between working for ride-hailing platforms and traditional taxi companies (Xing 2022; J. Y. Chen 2018).

Some companies are trying to rewrite the scripts on which constellations should be understood as trustworthy, e.i. taxi services do not require a car with a roof sign. A person can get into a stranger's private vehicle while the company conducts security checks and supervises the vehicles. Other companies, such as Shouqi Yueche, draw on materials that symbolize being official (see Chapter 8, section 8.3.3) and thus "mimic" the material symbols of taxis and government vehicles. In turn, the mobility platform contributes to the construction of the driver and vehicles. This can happen in manifold ways, including vetting procedures and the technological attributes of the apps. Security technologies (e.g., recordings, panic buttons) play a part in shaping the understanding of the vehicle-driver-platform constellation as a whole. At the same time, it is apparent that the narrative of Didi drivers as unsafe following the murder cases has had a very high impact on these constellations and is difficult, yet not impossible, for the company to "overwrite" it. Furthermore, as attempts to delegate safety work to technology have not been completely successful, the burden of ensuring security remains the responsibility of many users, particularly female users.

Therefore, these constellations, in turn, shape practices in the form of safety work. The second question posed in this chapter was; *How do different actors attempt to make ride-hailing safe?* As pointed out by Pinch and Bijker (1984), when problems with new technologies are identified, various technical and non-technical solutions are proposed by different actors or by "relevant social groups," and this is also the case for ride-hailing. In this context, relevant actors are users, companies, the state, and the media.

The different sets of actors operate with different descriptions of the problems and thus prescribe different solutions. For example, Didi has pointed to its technological solutions as failing and has implemented various measures, such as an app-based emergency button, audio recordings, upgrading vetting procedures, and even limiting access to the service for female users. In addition, the state has implemented various regulations for the ride-hailing sector, such as increased state-mandated vetting of drivers. However, the delegation to technology and through government regulations does not seem to be completely successful, in that users continue to employ strategies to compensate for lack of trust. Including making conscious decisions about when and where to travel, which are practices that state-owned media have underplayed. Thus, maintaining a sense of safety is negotiated through various day-to-day

self-protection practices, and constructions of safe mobility inform movement in time and space.

The case of ride-hailing in Beijing underscores how there is an ongoing co-construction of movement, symbolic representations, routinized practices, and the cognitive aspects of safety work. While spatio-temporal movement mediated through transport technologies can be understood as an outcome of a domestication process (Anfinsen, Lagesen, and Ryghaug 2019; Sørensen 1994), in the case of ride-hailing, such movement is also understood as restricted or/and are subject to precautions. Therefore, technologies must align with existing symbolic configurations to be “fully” domesticated (Ryghaug and Toftaker 2014). The domestication of ride-hailing meets resistance as it conflicts with pre-existing symbolic configurations of the drivers. As such, the case of ride-hailing underscores the point made in other contributions drawing on domestication theory, such as Aune et al. (2016) and Korsnes, Berker, and Woods 2018, that domestication of technologies does not necessarily imply a stable closure and that some parts of technology may be rejected.

With regard to the empirical example presented in this chapter, two concerns arise simultaneously. When discussing gender-based violence and prejudices, one needs to place blame appropriately and, at the same time, problematize the fact that people may often be mistakenly seen as untrustworthy. The safety risk and self-protection work performed by women ought to be taken seriously, and women’s legitimate ability to move across spaces at different times should not be undermined. Still, it is timely to ask what potential harm is being done to male drivers by having their work mediated through platforms such as mobility platforms. Clearly, the app features that enabled sexualized reviews of women are reprehensible and should never have existed in the first place. Still, the possibility of giving drivers bad reviews based on preexisting stereotypes remains, which can impact their incomes. In addition, such constructions underplay the presence of dangerous customers (Turner and H anh 2019). Thus as women’s mobility is restricted by the presence of gender-based violence, a complex myriad of actual or perceived identities and prejudices restricts economic opportunities for drivers. As such, the mediation of ride-hailing services through platforms also has implications for the drivers, as they are increasingly being subject to algorithmic and regulatory control.

Ample research from various geographical locations has documented the presence of gender-based harassment in public spaces (Boyer 2022; Gardner, Cui, and Coiacetto 2017; Ceccato and Loukaitou-Sideris 2020, 2021; Ilahi 2009), and self-protection strategies and safety work

(Dhillon and Bakaya 2014; Quinones 2020; Vera-Gray and Kelly 2020). In addition to academic contributions, self-protection strategies and self-monitoring of how, when, and where one moves around in public space are likely to be recognizable for many. Examples include of such strategies and self-monitoring are calling a friend when walking home at night, carrying pepper spray, or avoiding areas without proper streetlights. At the same time, I argue that the introduction of platform mobility has introduced two new elements which I will deliante in the following.

First, safety work done by women has been described as an invisible and integral part of being a woman (Kelly 2017; Vera-Gray and Kelly 2020) and “absorbed into the body” (Vera-Gray 2017, 134). In many circumstances, this is very much the case, and one might police one’s body without even being aware of it. At the same time, I would argue that what we see in this case is that with the introduction of new technologies, safety work or self-protection practices are easier to pinpoint. For example, it is easier to be aware of strategies that are new to our everyday life, such as sending screenshots. Platform mobility thus becomes a prism through which safety work is made highly visible. As such, in the context of ride-hailing, user were readily aware of the practices they were engaged in. As ride-hailing introduces new constellations of technology and actors, safety work performed in the context of ride-hailing was hardly invisible or absorbed into the interviewees’ bodies.

Second, I have shown how platform mobility provokes a sense of increased need for safety work, thus not only making safety work visible but also actually producing more of it. I would argue that this results from two parallel processes: women are constructed as victims and men as potential predators. Both processes are mediated through the mobility platform. Furthermore, there seems to be a co-production of two identities for male drivers: being a Didi driver and not being local and therefore more unreliable. These two identities might even reproduce each other. By contrast, women who use such services are seen to engage in more risky behavior and a narrative is created that women ought to take precautions. Thus, the shared representations (Cresswell 2010) of what it means to be a driver and a user of ride-hailing services differs from using taxis mediated through the mobility platform. In this context, it is important to highlight that these are precisely constructions or shared representations. As pointed out by feminist scholars, such as Vera-Gray (2017, 167) embodied self-protection strategies can also be understood as a form of resistance (Wilson 2000). In other words, the examples discussed in this chapter could also be regarded as a form of agency on the part of women.

10. Conclusion, Further Research, and Policy Implications

The private car has become a “Swiss army knife” for mobility needs. Whether traveling short or long distances, carrying one person or a family, or bringing suitcases or a wallet, the car is often the answer. Looking ahead, breaking up the “Swiss army knife” into more tailored modes of moving around, or an intermodal transport system, has been identified as one of the greatest hope for decarbonizing the transport sector (Kemp, Geels, and Dudley 2012). However, it would be a shortcut to assume that replacing car ownership with “door-to-door multi-modal mobility services” automatically decreases emissions (Pangbourne et al. 2020). Rather, faced with innovations in the transport systems, we need to question if they contribute to breaking or re-making the system of automobility (Urry 2004), what practices they are replacing, and the social implications of alternatives to the private car. Whether in the hands of private or public bodies, the result of new forms of mobility is hardly pre-given. As spatial and social mobility is tightly intertwined (Zhang 2019), this thesis attempts to approach some of the implications of alternatives to private car ownership – and if platform mobility is positioned to challenge the private car.

Against this backdrop, I have taken dockless bicycles and ride-hailing in Beijing as a case and asked; *How has platform mobility been embedded into China’s mobility system, and which changes has this development brought about?* I have sought to capture components of everyday life in Beijing through a practice lens while not losing sight of how constellations of platform mobility are held together and can be understood to make up a sociotechnical system. Taking dockless bicycles and ride-hailing as a case, this thesis contributes to understanding the introduction of new transport services and how they are intertwined with regulatory approaches and everyday life.

The first section (10.1) of this concluding chapter focuses on the empirical findings in light of the theoretical framework; sociotechnical systems, platforms as infrastructure, domestication theory, and perspectives from the mobilities turn. The discussions in the first section reflect the sequential order of the empirical chapters of this thesis (from Chapter 5 to Chapter 9) and end with a discussion of what we can learn about embedding new transport technologies. The last part of section 10.1 also highlights what the thesis contributes to STS, the mobilities turn, and understanding governance in China. Thereafter, in section 10.2, I discuss the limitations

of this thesis and avenues for further research. In the final section, 10.3, I present reflections for practitioners by discussing future challenges and opportunities for platform mobility in China and beyond.

10.1 Concluding discussion

10.1.1 Re-configurations and re-constructions of transport technologies

The first research question (RQ1) posed in this thesis is: *How have cars and bicycles been reconfigured (politically, socially, and culturally) since the establishment of the People's Republic of China, and to what extent does platform mobility shape the understanding of private car ownership?* To begin to answer this question, I addressed the changing role of the bicycle and the car through their roughly 120-year history in China. Significant shifts in social meanings, user practices, political approaches, affordability, technology, and design have taken place. The changing role of the two transport technologies reflects broad sociopolitical changes in China and changes in infrastructure, urban planning, organization of work, and economic development. In line with such large-scale changes, the roles of cars and bicycles have shifted in peoples' lives. Today, the car and the bicycle in China are not coherent social signifiers, and a plethora of meanings are attached to different forms of car and bicycle cultures and material configurations.

In many parts of the world, the automobility systems appear frustratingly cemented and tied to a number of stabilizing mechanisms, such as urban planning, industry structures, and practices (Geels et al. 2012; Holden, Gilpin, and Banister 2019). However, looking back in time, it becomes apparent that changes happen. The radical changes in the Chinese urban mobility system outlined in Chapter 5 indicate that the automobility system is not set in stone, and neither is transport technologies' dominance determined by economic development or a "natural" outcome of modernization. While car ownership cannot be understood independently of economic growth, prioritizing the car was an active political choice in China. In contemporary Beijing, the contours of yet another political shift are visible, where the car's role as the center for urban transport planning is being challenged. While many of the same spatial and socioeconomic structures that co-shaped the automobility system remain,

Beijingers are increasingly faced with challenges to private car ownership. Such processes have implications for the embedding of new constellations of transport technologies.

In addition to looking at historical changes, I unpacked approaches to transport technologies in Chapter 5. I discussed how processes of electrification and digitalization reconfigure shared representations and political responses to transport technologies. Platform mobility should be understood as one example—an important one—of hybridization of transport technologies (Sheller 2007). By feeding into the narrative of innovation and progress, “smartification” of bicycles and cars alters their positioning in the mobility system. The interplay between technology and politics is central to understanding why and how transport technologies mediated through mobility platforms face a more lenient policy framework than their more analog cousins. In other words, an innovation-hungry political context has implications for regulatory approaches. At the same time, multiple actors shape regulatory outcomes, which in turn provides a context for addressing the second research question.

10.1.2 Negotiating regulations and state-led technological ambitions in a patchwork

Chapter 6 addresses the second research question (RQ2): *How do platform mobility companies negotiate regulatory processes, and to what extent are they actors in state-led technological ambitions?* I argue that platform mobility companies and the state have positioned platform mobility and other technologies provided by the companies as supporting the state’s efforts to innovate the transport system and provide alternatives to private car ownership. I have detailed how platform mobility companies invest significant efforts and apply various strategies to impact policy outcomes and gain information about plans to regulate the sector. The companies are able to use their resources of technical capabilities, data, and internal expertise to assist government-led innovation efforts, which in turn can aid their position in such regulatory negotiations. Building on such resources, the companies participate and, in some cases, initiate various projects aimed at technological upgrading. Furthermore, I have shown how companies stake out their own projects and ambitions through company-led “intelligent transport” projects.

Platform mobility is a sociotechnical system that should be understood through its configurations as outlined in section 3.1.2 in the chapter on theoretical approaches. In Chapter 6, I have built on this argument by positioning platform mobility as sociotechnical configurations of state-led technological ambitions. I argue that the projects presented in

Chapter 6 are positioned to align with political goals, and in some instances, the projects gain government endorsement. Platform mobility companies' role as a configuration of "smartification" of the Chinese transport system results from the state's openness for private companies to act as drivers for innovation, and the platform mobility companies embraced this opportunity. The case of platform mobility thus shows how visions of the ways in which innovation and technological progress should be achieved and who should participate in such processes are shaped by several actors.

However, understanding the projects as state-led does not imply a top-down organization. The Chinese state should hardly be understood as a monolith (Heilmann 2017; Weber and Qi 2022), as local interests and initiatives at the sub-national level are important driving forces for decision-making (Heilmann 2011). By building on understandings from scholars of Chinese governance, such as Sebastian Heilmann, and the argument by Noesselt (2020), I argue that projects aimed at intelligent transport systems (ITS) are highly fragmented. As such, they exist in parallel but are not a part of state-led "experimentation under hierarchy" (Heilmann 2011). Thus, instead of witnessing a top-down organized system, we are seeing a "patchwork" of ITS (Noesselt 2020, 548). For example, I have illustrated how various establishments and participation in projects are dependent on personal relations at a local level, "friendly environments," and previous collaborations. A duality characterizes the projects in that they align with political goals without being coordinated top-down. In this manner, I position the findings of this thesis as a contribution to the literature that seeks to nuance ideas of a singularly hierarchical political system. Rather, leaders at the municipal level are important in initiating and engaging in collaborations on technological developments in the transport sector.

Chapter 6 discusses how platform mobility shifts power structures between the state and private actors in line with a shift in access to information, capital, and market concentration. However, such power structures are by no means stable. Since 2021, the state has addressed platform and other technology companies' power through various political packages. While platform mobility companies aim to cement their role in ITS development, their role is certainly not stable. Therefore, their role as "sunk" into other sociotechnical systems (Star and Ruhleder 1996) is subject to constant negotiations, and this recent shift reminds us to ask *when* infrastructure is (Star and Ruhleder 1996).

10.1.3 Car ownership: making and breaking links

Following Chapter 6 on regulatory negotiations and platform mobilities' role in state-led technological ambitions, I have discussed private ownership of cars in contemporary Beijing. Accordingly, Chapter 7 addresses the second part of the first research question; *How have cars and bicycles been reconfigured (politically, socially, and culturally) since the establishment of the People's Republic of China, and to what extent does platform mobility shape the understanding of private car ownership?* In this thesis, I have examined everyday practices through the lens of constellations of mobility (Cresswell 2010, 2016) and domestication (Sørensen 2006) of mobility technologies. These two approaches to practice are applied in the chapters detailing practices “on the ground” in contemporary Beijing (Chapters 7, 8, and 9). In addressing the extent to which platform mobility shape understandings of private ownership, I argue that it has to some extent, changed mobility practices, particularly young, urban Chinese people's mobility practices. However, I also stress how multiple processes are at play in the transport sector. As private companies launch platform mobility services, restrictions and complications relating to car ownership and use exist side by side. At the same time, car ownership remains an important aspiration. Therefore, in understanding the automobility system, we need to ask which links are made and broken (Shove, Pantzar, and Watson 2012) between car ownership life events, recreation, embodiment, and situations where the car is “on display.”

In Chapter 7, I do not seek to downplay the importance of the everyday configurations of mobility. Instead, I want to highlight how everyday life and life events should be understood in tandem. For example, the car's role in marriage is, or has been, significant precisely because it lays part of the groundwork for the expectations and coming configurations of everyday life. At the same time, I suggest that restrictions on cars and congestion are contributing to weakening links between marriage and car ownership. Accordingly, I show how spatiotemporal mobility, policy, and shared representations are intertwined.

I also address the car as a symbol of freedom. In China, car ownership is more closely connected to socioeconomic security, convenience, and social status than to freedom (J. (Jun) Zhang 2019). However, the example of vacationing shows that traveling beyond the city is connected to shared representations about exploring and freedom. Additionally, drawing on Sheller (2004) and Cresswell (2010, 2016), I have stressed the importance of how the car is

embodied. Within Beijing, the car offers an air-conditioned space to enjoy time alone. Therefore, regardless of how sluggish traffic is, the car offers a positive sense of embodiment.

10.1.4 Platform mobility in everyday life: sociotechnical configurations through a practice lens

Chapter 8 and 9 seeks to answer the third research question; *How is platform mobility embedded into everyday life, and what implications does this process have for justice, safety, and constructions of gender?* Chapter 8 focuses primarily on the embedding of platform mobility in everyday life and the impacts of intensified commercialization. I discuss these aspects in this section. In the next section (10.1.5), I revisit and conclude discussions of gender and safety.

I contrast my interpretation, derived from sociotechnical configurations, to narratives that depict platform mobility as an abrupt emergence (as discussed in the introductory Chapter). At the same time, platform mobility also represents a case of intensified commercialization and new practices. Thus, in Chapter 8, I have aimed to make two points: (1) platform mobility represents a modification of the mobility system and technologies, and (2) intensified commercialization has implications for embedding. Perspectives from transitions research draw attention to how change occurs and how systems change (Geels 2012; Geels et al. 2017b; Köhler et al. 2017). At the same time, by integrating Star and Ruhleder (1996) understanding of infrastructure, we are reminded that systems are enacted through practice. Therefore, we cannot fully understand any mobility system without attention to practice. How a domestication perspective compliments constellations of mobility is, in Chapter 8, made clear by the need to pay attention to spatiotemporal mobility (Cresswell 2010, 2016) and the learned skills (Sørensen 2006).

By disentangling the sociotechnical configurations of platform mobility, I illustrate how it builds, modifies – and, in some instances – mutually stabilizes preexisting mobility practices, skills, materials, symbolic configurations, digital technologies, and capital structures. For example, the apps rely on QR codes and digital payment as technological facilitators. Furthermore, QR codes and platform mobility mutually reinforce each other in a stabilizing network. I also showed how dockless bicycle and ride-hailing companies draw on symbolic attributes of high-status cars and ‘bicycle kingdom’ nostalgia. Nevertheless, I argue that there is also a modification of shared representations as platform mobility is tied to a notion of

homegrown innovation. In other words, not only does platform mobility play into state-led ambitions on innovation, but also such notions can be witnessed “on the ground.”

The examples discussed in Chapter 8 also include how mobility practices are modified rather than radically changed through platform mobility. In the case of ride-hailing, this understanding is built on two observations. First, ride-hailing services are used in much the same ways and contexts as taxis. At the same time, the introduction of ride-hailing has made use of such services more appealing through, for example, price mechanisms and spatiotemporal organization. As such, the case of ride-hailing contributes to empirical studies that have shown how innovation in automobility can contribute to its longevity (Anfinsen 2021; Haugland 2022; Pangbourne et al. 2020; Schaller 2021). Second, private cars are not necessarily a part of the same mobility practices as platform mobility. These two observations show that ride-hailing hardly challenges the automobility regime. On a more optimistic note, dockless bicycles contribute to mobility practices that support and stabilize public transport practices.

Turning to the second point of Chapter 8, I discuss the implications of intensified commercialization. Importantly, platform mobility companies are geared toward increasing the demand for mobility. I question the concept of ‘shared mobility’ precisely because of the drive towards increased consumption. At the same time, I argue that the very same venture capital-driven mechanism geared towards increased consumption destabilizes and may even result in de-domestication of the same services. While there certainly are market forces at play, the widespread adoption of platform mobility should not be understood as simple manipulation by the companies. Rather, the empirical data show that using platform mobility is associated with positive embodied experiences.

As a privatized form of mobility, ride-hailing, and dockless bicycles are unevenly embedded in the urban population. In Chapter 8, I have also illustrated how the variation in uptake relates to skill sets, temporal and monetary resources, and spatial distribution. Users experience dependence and independence differently with regard to dockless bicycles and ride-hailing. Drawing on the journal article by J. Y. Chen and Qiu (2019) I argue that as apps become a mediator for rides, they also gain infrastructural properties and become ubiquitous. However, I stress that the ubiquity of ride-hailing should not be understood as a form of technological determination. Instead, people’s dependence on the apps is co-produced by the number of users of the platform and social expectations of mobility. In other words, it is not

only the platform itself but the massive uptake of the technology in the population that co-produces such effects.

10.1.5 Gendered mobilities and constructions of safety

In Chapter 9, I address the same research question as Chapter 8 but look solely at the case of ride-hailing. To reiterate, the third research question is; *How is platform mobility embedded into everyday life, and what implications does this process have for justice, safety, and constructions of gender?* By continuing to expand on how platform mobility is unevenly embedded and experienced in the population, Chapter 9 highlights the perspective of women. At the same time, this chapter explores how gender intersects with class and migration within China.

Building on Sheller (2007) and Urry (2004, 2006), I argue that ride-hailing produces vehicle-driver-platform constellations. Shared representations of these constellations are shaped by the material configuration of the vehicles, preexisting representations about migrant workers as ‘the other,’ high-profile murder cases, and understandings of the ability of companies and technologies to ensure safety. These elements are highly entangled and mutually reinforce one another. For example, ideas about Didi drivers are shaped and reinforced by new stories on gender-based violence that thus relates back to the platform. Ideas about the material aspects of traditional taxis, compared to ride-hailing vehicles, shape ideas of with whom one can safely be a passenger. I problematize that vehicle-driver-platform constellations reinforce the ideas about drivers as ‘others.’ I suggest that constructions around these constellations are mediated through the apps increase suspicion and may, in turn, impact migrant workers’ ability to earn a living in Beijing. The constructions might also contribute to a higher degree of surveillance of platform workers by the companies and the state.

Furthermore, representations of female passengers are entangled in the vehicle-driver-platform constellations, shaping ideas about how women should behave. Women find themselves in a position in which personal and social exceptions of mobility clash with norms around caution. The internalization of such norms translates into practices aimed at enhancing one’s sense of safety. Therefore, by combining insights from gender studies (Gardner 1995; Gardner, Cui, and Coiacetto 2017; Kelly 2017; Vera-Gray and Kelly 2020), STS, and the mobilities turn, I have unpacked how platform mobility generates safety work through the hybridization of mobility. I show how women invoke ‘absent protectors’

(Gardner 1995, 206) through phone calls, sending screenshots to friends and family, paying attention to the GPS, and making sure to sit in the backseat. Drawing on the concept of ‘delegation’ from STS (Sørensen 1994, Johnson (Latour) 1988), I understand these strategies as a form of partial delegation to technology. In this manner, built-in safety functions in the apps are not domesticated in the way that ride-hailing companies intended. Beyond these app-based safety features, ride-hailing companies and public institutions intended to ensure passenger safety. Yet such responsibilities do not necessarily curb safety work as neither is trusted to perform such tasks adequately. In other words, delegation to both human and non-human actors (Suboticki and Sørensen 2020) remains partial.

10.1.6 Platform mobility: potential for change and societal consequences

This thesis contributes to the field of STS and mobility studies in several ways. First, it answers the call of STS and mobilities scholars to extend the empirical literature base beyond the Western context (Aouragh 2011; Invernizzi et al. 2022; Korsnes, 2015; Mormina 2019; Sovacool et al., 2020). While STS scholarship from a Chinese context is growing (Bartholomew 2020; Deutch 2018; Y. (Yifei) Li and Shapiro 2022), it still needs further development. Second, this thesis addresses an understudied field in the intersection of STS and mobilities studies. Specifically, it contributes to these fields by empirically detailing how systems and infrastructures are enacted through practice. While attention to company practices, regulations, and use are discussed in separate chapters of the thesis, the overarching analysis emphasizes the need to understand them in tandem. For example, I have shed light on user understandings of to what extent their safety is ensured by regulatory enforcement and ride-hailing companies. Moreover, companies and regulatory bodies are attempting to shape by, for example, advising and limiting spatio-temporal mobility through platform mobility and credit ratings. Further, as stressed by STS scholars (Kearnes 2010; Korsnes 2019; Stilgoe, Owen, and Macnaghten 2013; Sørensen 2013), I illustrate the enactment of the politics of innovation and how various actors shape the governance of platform mobility in China. Thus, this thesis shows how technological systems build on preexisting structures without being determined by them. Such new technological configurations, in turn, are embedded into policy and shape future mobility systems and structures. Just as platform mobility represents a continuation of past mobility systems, new spatiotemporal practices, embodiments, symbolic configurations, skills, and material aspects appear in relation to the

development of sociotechnical systems. Finally, the thesis underpins how technological systems are re-produced but can still be made otherwise.

In the following, I highlight some of the most important insights that surfaced during the analysis:

There is clearly a need to speed up transitions towards a more sustainable mobility system. As such, innovations in the transport system are often met with enthusiasm. However, we also need to slow down and ask what rapid uptake of transport technologies entails. For example, what potential for changes do they bring, and can they contribute to the longevity of an unsustainable transport system? In the case of platform mobility, the launch of new transport technologies has not fundamentally challenged existing mobility practices. This is problematic because platform mobility largely replaces walking, public transport, and conventional taxi services. Such a realization is central to understanding why the uptake has happened so fast. In other words, technologies that do not challenge how we organize our lives are more likely to meet less resistance than technologies that do.

For platform mobility to bring about deep-rooted transitions, it needs to be accompanied by broader societal change. Platform mobility and the private car will continue to exist side by side unless the private car is challenged politically with efficacy. Further, the potential of platform mobility to replace private car ownership is questionable because the two forms of mobility are linked to different practices, aspirations, social meanings, and embodiment. These observations highlight the need to understand elements that make car ownership resistant to change across cultural contexts, whether related to feelings of freedom, second home ownership, safety, family, cooling down, spatial planning, or social status. The interplay of such aspects is not easily quantified and highlights the need to study mobility from a sociotechnical perspective.

The thesis also highlights the potential of digital platforms to produce and re-produce prejudices and problematic gender relations. Studies of gendered mobility have often positioned women as disempowered and men as highly mobile subjects (Cresswell and Uteng 2008; Sheller 2008). By not only considering gender but also how gender intersects with class and migration, we see that the links between mobility, gender, and power deserve more attention. Men and women can be marginalized, often in different ways, through the mobility system, which in turn has implications for spatiotemporal and social mobility. As safety is often prioritized in mobility practices, we need a deeper understanding of such processes

when thinking about a sustainable and just transport system for the future. As such, I encourage intersectional analysis, which enables accounting for complexity and co-production of multiple identities, material components, user understandings, and representations that shape understandings of safety.

The rapid and unauthorized launch of platform mobility is a unique starting point for understanding the Chinese state. It is a fascinating case as the state grappled with highly contradictory considerations between being open to innovations and addressing controversies. Further, platform mobility companies were granted space and endorsement in *retrospect* of their launch. As such, platform mobility contrasts other cases in the Chinese technology and mobility sector; both state-driven technological developments (EVs and Beijing's Software Park) and state-sanctioned bottom-up technologies (e-bike). While China scholars have nuanced the notion of solely top-down decision-making processes (Heilmann 2011; Lieberthal 1992; Mertha 2009), a diverse and rich set of examples is needed to inch towards an understanding of the interplay of actors, including private companies and a state that does not intend to be understood. As such, the thesis contributes to the understanding of mobility and technology governance over time in a non-democratic context.

10.2 Limitations and future research

As platform mobility is a highly encompassing research subject, I believe there are plentiful avenues for further research. In this section, I will delineate the shortcomings of this study, accompanied by avenues for further research.

As a project aiming for a comprehensive approach to platform mobility, this thesis has some shortcomings. In particular, the experiences and practices of platform workers are lacking. However, in the case of ride-hailing, such perspectives have been covered by other highly interesting contributions, such as those of J. Y. Chen (2018) and Xing (2022), which have a Chinese perspective. Other valuable contributions based on qualitative methods from other geographies have come from studies conducted in Indonesia (Sandbukt 2021), Germany (Frey 2022), and Vietnam (Turner and H anh 2019). However, I believe there is room for

research on other forms of platform work, such as dockless companies' maintenance workers. For example, studies describing how workers navigate app-designated tasks.

In the thesis, I have approached platform mobility from a wide variety of sociotechnical configurations. However, as outlined in Figure 6, section 3.1.2, in the chapter on theoretical frameworks, I have paid more attention to certain aspects than others. For example, one of the questions I pursued during fieldwork was how the presence of platform mobility interplayed with transport infrastructure planning. I wanted to know the answers to the following questions: Does the presence of last-mile/first-mile services impact the understanding of how far apart public transport stations can be, and what effects does this have on people who do not have access to platform mobility? Do planners understand the presence of dockless bicycles as an impetus for speeding up the construction of bicycle infrastructure? Unfortunately, I did not have adequate data to address the questions in this thesis. Moreover, the thesis does not cover fuel infrastructures. Ride-hailing companies seek to partner with EV manufacturers, which may affect charging infrastructure. Additionally, short-term rental of vehicles may facilitate the test driving of EVs in practice, yet what implications does this have for understandings EVs? While the thesis addresses the intensifying commercialization of mobility on the ground, it does not examine the business structures and capital flows in depth. Given that we are seeing venture capital withdrawing from platform mobility companies, this raises the question of what implications this will have for destabilization. In addition, I believe there is interest in contributing to investigating data privacy and security from an expert and user perspective, which is an understudied aspect of platform mobility in the Chinese context (Song, Liu, and Ma 2022).

An obvious shortcoming of this thesis is the missing perspectives of planners and policymakers. In particular, this is important for gaining a more nuanced perspective on government-company collaborations. The company interviewees expressed that they had a good collaboration with public bodies. However, following interviews with planners and local government officials, Cao et al. (2022) shed light on how communication was certainly not friction-free. While not entirely uncovered by the literature (Cao et al. 2022; Spinney and Lin 2018), I believe that the perspective of planners and policymakers in relation to platform mobility warrants further investigation, particularly due to the new political orientation towards the technology sector in 2021.

Furthermore, while this thesis reports the comments of interviewees from different segments of the population, urban professionals have been overrepresented. Therefore, the perspective of low-income populations, older people, and people with vision impairments warrants further investigation. In short, the equity aspect of platform mobility in China remains understudied (Song, Liu, and Ma 2022). I believe that this thesis shows the perspective of marginalized groups is highly interesting. Therefore, a more thorough look at how inclusive these platforms are and what implications their presence has for people with limited access deserves more attention.

The last avenue of further research that I want to highlight is the coverage of recent changes in the technology sector in China, with or without particular attention to platform mobility. As outlined in Chapter 6, there has been a significant shift in how the Chinese state relates to the technology sector since 2021. Corruption, control over capital flow, and addressing monopolistic tendencies through anti-trust regulations are elements of new directions from the CCP. How can we understand China's drive to curb the power of the technology sector? How can these trends be understood in light of global changes in transnational approaches (cf. GDPR and the EU) to regulate data privacy and tax evasion? How does China's approach to the technology sector compare with that of other countries; especially with other "tech superpowers," such as the US? How can we understand cross-country differences with attention to different understandings of the free market and governance structures?

In short, there is ample room for further research, and I hope this thesis spurs interest in further inquiry into the above-mentioned topics.

10.3 Looking ahead: reflections for transport practitioners

Given that we accept the promises of multimodality and reorienting transport systems from ownership to use, how can such systems be improved? In the following, I will discuss possibilities and limitations of ride-hailing, public bicycle-sharing, and privately driven on-demand micro-mobility. I will expand the scope from covering dockless bicycles to also include other forms of slow-speed, lightweight on-demand transport services. Practitioners include operators, civil servants, consultants, and central, provincial, and local policymakers.

Below, I have organized my reflections according to the following topics; sustainability, inclusion, use of public funds, dockless options for public systems, privacy, and user-friendly payment options.

Sustainability

- In the case of micro-mobility, the longevity of materials and reducing carbon-intensive modes of traveling are central. Regulations should include standardizing parts that aid repair and reuse in micro-mobility devices. In the Chinese market, platform mobility companies have launched new designs and models, partly because of government mandates (for an example from Nanjing, see Cao et al. 2022). While the newer models of bicycles might be sturdier, constant upgrading can complicate reuse of parts and lead to increased waste.
- In the Chinese case, dockless bicycle companies are subject to regulations that cap the maximum life span of bicycles. Instead of limiting the life span, regulations should encourage production of higher quality micro-mobility vehicles with longer life spans.
- It is vital to implement regulations that address the numbers game of the private actors in micro-mobility. As observed in the Chinese case, some of the adverse effects of oversupply can be mediated through allocation quotas for each company. At the same time, if the quotas are allocated based on performance indicators and if quotas for different companies are adjusted over time, some companies will have surplus micro-mobility devices contributing to the number of unusable devices.
- A concentration of micro-mobility around public transport is an important way to support the use of public transport systems.
- In the case of ride-hailing, regulations in China are in place limiting vehicle mileage and the age of vehicles, thus possibly incentivizing the purchase of new cars. An alternative could be to implement regular checks of the vehicles. Also, incentives may be targeted toward electrification of ride-hailing and other forms of on-demand car-based services.
- In privately driven platform mobility systems, capital is derived mainly from private companies which base their operations on selling products. As such, privately run micro-mobility and ride-hailing are entangled in systems geared towards

unsustainable consumption practices. Therefore, a pressing question is whether we can achieve sustainable transport based on capitalist logic.

- In the two countries that have implemented a vehicle quota system, China and Singapore, taxi and ride-hailing services are widely used (Ang 2023; R. Lee and Kam 2014; B. Tang et al. 2020). These practices certainly relate to income inequality and are thus a product of socioeconomic challenges beyond the mobility sector. At the same time, such practices may imply the need to start considering restrictions on car-based services that are not founded on price. In China, ride-hailing companies now have to be licensed; therefore, limiting the number of licenses could be possible going forward. Alternatively, it might be possible to envision a system based on user quotas for car-based services. I do not argue that user quotas are the best solution. However, thinking in such terms might reduce the chance that limited supply drives prices up, which in turn can have adverse consequences in terms of access for less wealthy segments of the population. Suppose we are moving towards a transport system based on usage over ownership, we need to pay serious attention to how such a system be realized without continuing mass automobility and in which taxis and ride-hailing services would function as private chauffeuring services. Again, this relates to the point that platform mobility is not, by nature, sustainable.

Inclusion

- Mobility connects us to central societal functions, such as employment, education, and health care. Weakness in privately run micro-mobility systems poses a greater risk of uneven spatial distribution of services across high- and low-income neighborhoods. However, publicly funded schemes are not immune to this unbalanced allocation either (Bradshaw 2021; Duarte 2016). Therefore, spatial distribution is something that both providers of both public bicycle-sharing systems and on-demand micro-mobility services need to be aware of. In both cases, a minimum requirement of spatial distribution across neighborhoods could be effective if implemented.
- Mobility can be positioned as less of a commodity and more as a public good. Regardless, this does not mean that micro-mobility and public transport should be solely tax-funded. Co-payments could be a viable option (such as the Scandinavian health care model). Nevertheless, an essential premise is that such services should

decrease economic differences between people in a future scenario that would be more reliant on less private ownership and increased multimodality.

- While dockless bicycles in China have been relatively cheap, the private system is certainly not immune to price increases. In particular, as the system is heavily reliant on volatile venture capital, there are implications for price growth as investors have started to withdraw. In China, public bicycle-sharing for use in cities is often far cheaper (and sometimes free for 1 hour), but they are usually less accessible than bicycles accessed in other ways. Creating a system in which accessibility and low prices are achieved ought to be possible, but it might require more commitment from policymakers.
- Publicly driven systems are, at least in theory, oriented toward servicing the public good. A public ride-hailing and short-term car rental system might be more difficult to envision than a private rental system for micro-mobility. However, there are car rental services and other on-demand car-based services provided by non-profit companies, co-ops, organizations, and partly state-owned companies (Nenseth, Julsrud, and Hald 2012). As political forces within the Nordic countries envision a health care system free of for-profit actors, a similar vision might be realized for car-based on-demand transport and, for example, operated by public transport providers.

Use of public funds

- Public savings are often highlighted as an advantage to privately driven micro-mobility over public shared bicycle sharing. However, a private system requires considerable public resources, which include making regulations, clean-up, supervision (Cao et al. 2022), and risk avoidance (for example, fire hazard of battery-driven micro-mobility such as e-scooters). Therefore, it is important to consider which systems are more resource intensive.

Dockless options for public systems

- I argue that experimentation with public, semi-docked systems is a promising way forward. Docking stations have some obvious shortcomings in limiting where users

can leave bicycles and unpredictability concerning docking spaces. Systems can, for example, be organized mainly by relying on docks combined with the possibility of leaving the bicycle within a geofenced area close to the dock. Such a solution may have the dual benefit of reducing public obstruction and increasing predictability. Alternatively, a fully dockless system could be implemented. However, again, to avoid causing obstructions, either geofencing or other ways of documenting and supervising parking are possible options. While geofencing, or “invisible docked bikes” as one expert interviewee called it, has limitations in terms of flexibility for users, it contributes to the overall well-being of the urban population. After all, providers should not only be oriented towards user-friendliness but also walkability and mobility for people with vision impairments, and people reliant on mobility aids.

Privacy

- In public and private systems alike, data privacy is a central concern as mobility is increasingly digitalized. While Chinese and European legislation has attempted to address privacy, such policies have shortcomings. In particular, as mobility and non-mobility services are tied together in digital networks, and as we see a striking example in the Chinese context, such concerns become increasingly pressing. In the Chinese context, mobility is tied to personalized identity markers (such as ID, contact information, and debit cards) based on attempts to avoid unwanted behavior and enable digital payment solutions. Careful considerations of protecting users’ identities and data are needed. As intertwined digital systems may reproduce inequalities, it is also timely to consider whether to untangle such links.

User-friendly payment options

- While many publicly managed bicycle-sharing systems worldwide have suffered from less user-friendly payment options, these are not necessarily aspects on which publicly managed systems cannot improve. Several public schemes have already implemented online payment options, and this should be a minimum requirement for user-friendliness in public schemes. However, online payments must be coupled with alternative payment options to ensure accessibility across populations.

- In a publicly run system, integrated payment systems with public transport. While proven difficult to realize, partly due to regulatory challenges (Y. (Yanying) Li and Voegelé 2017), ambitions to solve integrated payment systems are often positioned as a central aspiration for realizing “true” Mobility-as-a-Service (MaaS). Additionally, there is a case to be made for price structures to lower the bar and reward active users of public transport and micro-mobility. One example of such a pricing system is a system whereby one pays for individual trips during a given period of time until a certain threshold is reached (e.g., equivalent to the price of a monthly card). While this may be an incentive to consider in the case of bicycles, the sustainability implications for car-based transport may be more dubious. However, simplifying payments for car-based mobility could be a way to lower the bar for parts of the population and contribute to making alternatives to private cars more viable.

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Appendix A: Request for Participation

Request for participation in research project, English:

“Artificially Intelligent decarbonisation: ICT-companies and Big Data in Chinese Urban Transport Systems”

Background and Purpose

The research is conducted for Thea Valler’s PhD dissertation, Norwegian University of Science and Technology(NTNU), where the funding from the project comes from.

The topic of the dissertation public-private cooperation on ICT enabled transport infrastructure, but will also touch upon issues such as urban air pollution and traffic congestion. I seek to investigate how ICT enabled transport platforms are being implemented into the broader transport and environmental policies. Further, how they are being managed, what risks this entail for the participants of the project and the stakeholders motivation for engaging in it.

What does participation in the project imply?

The data is mainly done through qualitative interviews with employees in the municipal transportation bureau and relevant private ICT companies. The data will rely on notes or recordings from these interviews. The thesis will also rely on secondary, written sources. The timeframe for the fieldwork in Beijing is February to July, 2019 and February to April, 2020.

What will happen to the information about you?

I will treat all personal data will be treated confidentially. Only I, the author of the thesis, will have access to personal data. List of names will be stored non digitally, and away from other types of information regarding the project. The informants will have anonymity The project is scheduled for completion by March 5th, 2022. The information given will be treated with great care and delated after submission and defense of the PhD-dissertation.

Voluntary participation

It is voluntary to participate in the project, and you can at any time choose to withdraw your consent without stating any reason. If you would like to withdraw, gain access to the recording or transcription of your interview, or if you have any questions concerning the project, please contact: Thea Marie Valler at thea.m.valler@ntnu.no, + 47 930 92 543, + 86 130 7676 3786

Consent for participation

I will ask you to give your consent orally on the interview recording, where your name will not be stated. Information that will make your identity traceable will be kept separate from the interview recording, and not in a digital format.

Request for participation in research project, Chinese:

参加研究项目同意书

以下是邀请您参与旨在增进对中国智能交通系统了解的研究项目的请求。信中包含了有关项目目标的信息，以及参与该研究项目对您的可能影响。

研究目标

这项研究是为挪威科技大学 (NTNU) 的 Thea Valler 博士论文写作而进行的，该项目的资金也来自该大学。

论文的主题是北京的智能交通解决方案。专注于北京市基于应用的共享交通解决方案以及其可持续发展潜力。该项目从社会科学的角度审视围绕这些新型交通解决方案是否达到了改变出行习惯、公共政策和公司战略等问题。

论文一共包括在学术期刊上发表三篇学术文章。论文还将包括对数据收集方法的描述，以及访谈的匿名清单。论文全貌都将向公众开放。信息也会用于学术讲座和会议演示。

项目负责方

挪威科技大学 (NTNU) 将负责该项目，清华大学将作为合作伙伴共同参与。数据处理层面是 NTNU 和 Thea Valler 博士本人负责。

为什么您被要求参加？

因为

1) 由于您作为私人利益相关者、公共行为者或其他在该主题上的能力，您被要求参加。

或

2) 您是智能技术相关用户的一员，我对您的个人观点和经验感兴趣。

参与该项目意味着什么？

这些数据主要是通过对政府部门职工和相关私营信息通讯技术公司进行定期访谈收集的。参与者需要与我进行大约一个小时面对面对话，我将就你的专业知识和工作提出问题。期间我会对访谈记录笔记，并录音。相关数据资料将存储在我的工作电脑中。有关参与者的个人信息不会收集，只有有关该论文项目的信息会被收集。

论文的写作还将依靠其他书面资料来源。

在北京进行实地工作的时间是 2019 年 2 月至 7 月和 2020 年 2 月至 4 月。

自愿参与原则

参与项目是完全自愿的，您可以随时选择停止，无需说明任何理由，并且有关您的信息将被删除。选择不参与或退出不会给你带来任何负面后果。

您的信息会被如何处理？

只有在上文提到的相关论文需求数据才会被保留。我将根据挪威的数据保护标准对所有个人数据进行保密处理。只有本文作者我才能访问个人数据。

名称列表将以非数字方式存储，并且远离与项目相关的其他类型的信息。被访问者将是匿名的，无法被识别。该项目定于 2022 年 3 月 5 日完成。 这些信息（磁带录制和笔记）将被非常谨慎地处理，并将在提交和汇报博士论文后被删除。

您的权利

如果您在数据材料中识别了您的身份，您有权

- 访问注册的关于您的个人信息，
- 更正您自己的个人信息，
- 删除有关您的个人信息，
- 获取您的个人信息的副本，以及
- 向挪威数据保护局 (<https://www.datatilsynet.no/en/>) 投诉您数据的处理方式。

我只会根据您的同意使用相关信息。

了解更多信息

如果您有其他问题，或有想要列出的权限，请联系我。

如果您想退出，或访问您的面试录音，或有任何关于该项目的问题，请联系：

Thea Marie Valer，邮箱是 Thea.m.valler@ntnu.no，挪威电话 + 47 930 92 543，挪威科技大学文化跨学科研究系

如有任何疑问或您希望使用您的权利，请联系：

挪威科技大学数据保护干事，Thomas Helgesen，电子邮件：Thomas.helgesen@ntnu.no，或拨打其挪威电话 + 47 930 79 038

或联系：

挪威研究数据中心 (NSD)，电子邮件：personverntjenester@nsd.no 或拨打挪威电话
tel:+47 55 58 21 17。

同意参与

我将要求您在面试录音中口头同意，同时在录音中不会透露你的名字。保证您的身份和可追溯的信息与面试录音分开，不以数字格式保存。

Appendix B: Interview guides, user interviews

Example of interview guide, user interview, English

Interview guide, used in June 2019. Modifications to the interview during the span of the fieldwork guides occurred.

Before the interview starts:

Consent: Can I use information from this interview to write papers published in academic journals. (I will send information on this in advance in Chinese to the person being interviewed)

- I will not use your name, and your identity will not be possible to track from the papers.
- Can I use a tape recorder for the interview, or do you rather want me to take notes?

General questions/background

- Work, home, education level, family situation, household registration (hukou) or not and so on
 - For migrants: what did you work with in your home place?
- Can you tell me how your commuting habits have changed over the last five years?
- What considerations did you make when you moved/got married/ changed job/ engaged/planned for children?
- Can you tell me about how your traveling habits have changed over the last five years?
- Could you tell me about how you get to work (or studies) now?
 - do you employ different strategies according to (season, weather, traffic etc.)
- How about in your spare time, what transport mode do you use in your spare time or for leisure activities (for shopping, hobbies, visit to friends and family)?
- If it is really important for you to be on time, how do you travel?
- If you want a comfortable way of traveling, how do you travel?
- If, you want to travel the cheapest way, how do you travel?
- How important is environmental concerns for you, when choosing how to travel?
- How is the infrastructure (road, bike lanes, pavements) contributing to your choice of transport?
- Are you worried about the effect of air pollution on your health? Can you notice any impact on your health?

Shared mobility solutions

- What APPs do you have for traveling? (Maybe ask to have a look at the phone)

- Which ones do you use on a regular basis?
- What do you think about them, in general? Are they useful (which...)? Made your everyday commutes easier?
- Do you have any experience with car sharing apps?
- Can you tell me about when you started using them?
 - Did you start to use them right after they were launched, or did you take some time to download?
- Which apps do you prefer? Do you for example have a favorite ride hailing company? Or favorite type of bike?
- Do you think the bike sharing and ride hailing services are here to stay? (why/why not?)
- What about the price level, will they stay more or less the same?
- When planning for commuting in the future, do you take for granted that this will still be a possibility? (For example, distance to metro station)
- What do you think are the main purpose of these apps? What do you think are the strategy of these companies developing these services/apps?
- Do you have any worries related to using the apps? (Bad connection, information security, safety in regard to drivers...)
- What are your main safety concerns when using shared bikes, and ride-hailing?
- If it was not for bike sharing and ride hailing services, would it be more important for you to get a car?

Car/ Scooter

- Do you plan to buy a car in the future?
 - Are you in the license plate lottery at the time?
- What about a scooter? Is that an alternative for you?
- What about the type of e-bike that you need to peddle?
- What barriers would be associated with acquiring a car for you (costs, parking space, gas, taxes)?
- What kind of car would you like? What about electric cars (is that an option, what do you think about electric cars)? Chinese /foreign brands
- Would you need a car if you family situation (or work situation) changes?
- How important do you think it is to have a car when it comes to marriage (and status) in China?

Closing questions

- What are the main problems associated with transport where you live?
- What should government do about this?
- How do you think transport will change in the future?

Example of interview guide, user interview, Chinese

Interview guide, used in June 2019. Modifications to the interview during the span of the fieldwork guides occurred.

面试开始前:

- 同意: 我是否可以使用本次访谈中的信息撰写学术期刊上发表的论文。(我会提前用中文向接受采访的人发送有关此信息)
 - 我不会使用您的姓名,也无法从论文中追踪您的身份
 - 我可以使用录音机进行采访,还是希望我做笔记?

一般问题/背景

- 工作,家庭,教育水平,家庭情况,户口登记(户口)与否等
 - 对于移民:你在家做了什么
- 你能告诉我过去五年你的通勤习惯是如何变化的吗?
- 当您搬家/结婚/改变工作/参与/计划为儿童时,您做了哪些考虑?
- 您能否告诉我您的旅行习惯在过去五年中的变化情况
- 你能告诉我你现在如何上班(或学习)吗?
 - 你根据(季节,天气,交通等)采用不同的策略吗?
- 在您的业余时间,您在晶石时间或休闲活动中使用的运输方式(购物,爱好,拜访朋友和家人)怎么样?
- 如果准时到达真的很重要,你怎么旅行?
- 如果您想要一个舒适的旅行方式,您如何旅行?
- 如果您想以最便宜的方式旅行,您如何旅行?
- 在选择旅行方式时,您对环境的关注有多重要?
- 基础设施(道路,双线路,人行道)如何为您选择的交通做出贡献?
- 您是否担心空气污染对您的健康的影响?你能注意到对健康的影响吗?

共享移动解决方案

- 您有什么 APP 用于旅行?(也许要求看看手机)
 - 您定期使用哪些?
 - 你对它们有什么看法,我一般?它们有用吗(哪个.....)?让您的日常通勤更轻松?
 - 您是否有使用汽车共享应用程序的经验?
- 你能告诉我你何时开始使用它们?
 - 您是在启动它们之后立即开始使用它们,还是花了一些时间下载它们
- 您更喜欢哪些应用?例如,你有一个最喜欢的骑车公司吗?或者最喜欢的自行车类型?
- 您认为自行车共享和乘车服务是否仍然存在?(为什么/为什么不呢?)价格水平如何,它们会或多或少保持不变?

- 在计划将来上下班时，您是否认为这仍然是可能的？（例如到地铁站的距离）
- 您认为这些应用的主要目的是什么？您认为这些公司开发这些服务/应用的策略是什么？
- 您是否有任何与使用应用程序相关的担忧（连接不良，信息安全，司机安全.....）
- 使用共用自行车和乘车时，您的主要安全問題是什么？
- 如果不是自行车共享和乘车服务，那么开车是否更重要？

汽车/滑板车

- 您打算将来购买汽车吗？
 - 你当时在车牌彩票吗？
- 滑板车怎么样，这是替代方案吗？
 - 你需要兜售的电动自行车类型怎么样？
- 为您购买汽车有哪些障碍（成本，停车位，汽油，税收）？
- 您想要什么样的车？怎么样的电动车（这是一个选项，你怎么看待电动车）？
中外品牌
- 如果您的家庭状况（或工作情况）发生变化，您是否需要一辆车？
- 在中国婚姻（和身份）方面，您认为拥有一辆汽车有多重要？

结束问题

- 您居住的交通方面的主要问题是什么？
- 政府应该怎么做？
- 您认为未来交通将如何变化？

Appendix C: Interview guide, experts

Example of interview guide, expert interview, English

Example of an interview guide. Modifications were made according to interviewees and throughout the fieldwork.

Before the interview starts:

Consent: Can I use information from this interview to write papers published in academic journals? (I will send information on this in advance in Chinese to the person being interviewed)

- I will not use your name, and your identity will not be possible to track from the papers.
- Can I use a tape recorder for the interview, or do you rather want me to take notes?

Introduction

- Can you tell me about your former/current job at (platform mobility company)?
- What is/was your main tasks?
- How long did/have you work there?

Sustainability

- In your experience, was/is environmental issues a big focus at (platform mobility company)?
- Are you familiar with what (platform mobility company) is doing to enhance the environmental sustainability of their operations?

Expansion of business

- What was the main motivation for acquiring (platform mobility company)?
- Are you familiar with (technological projects, such as City Brain, Didi bus etc)?
- Could this business be profitable?
- Why do you think they expand their business to also include bus service?
- Are there other areas (platform mobility company) is looking to expand their services?

Big data

- What kind of data is shared with local governments?
- Are you familiar with Didi Brain?
- How important is the Didi Brain for government relations?
- What role does data collected from (platform mobility company's cars/bicycles) play in transport planning?

- Does data shared with local governments somehow decrease the value of this data?
 - In other words, does the economic value of big data change when shared with other actors?

Legal issues and government relations

- How has (regulations: caps on bicycle, hukou, etc) impacted the company's operations?
- What strategies are (platform mobility company) using to enhance their relations with the local governments?
- Are you familiar with any public-private collaboration?
- Are you familiar with any ways in which (platform mobility company) are seeking to impact the outcome of regulations?
- Is (platform mobility company) seeking to have an impact on transport planning in Beijing?
 - In case, in what ways?
- Did you have colleagues who formerly worked in the government sector?
- Do people in (platform mobility company) have a close connection with the local government?
 - Such as personal or professional relations?

Profitability and future directions

- At the time, what is the main challenge for profitability?
- What part of (platform mobility company) is most profitable?
- At this point, how are they cutting costs?
- Where do you think (platform mobility company) will be in five years?
- Will the company be more or less important than today?
- What will be their main business in the future? Will it still be ride hailing/dockless bicycles?

Example of interview guide, expert interview, Chinese

Example of an interview guide. Modifications were made according to interviewees and throughout the fieldwork.

面试开始前:

- 同意: 我是否可以使用本次访谈中的信息撰写学术期刊上发表的论文。(我会提前用中文向接受采访的人发送有关此信息)
 - 我不会使用您的姓名, 也无法从论文中追踪您的身份
 - 我可以使用的录音机进行采访, 还是希望我做笔记?

介绍

- 你能告诉我你在(platform mobility company) 的工作吗?
- 你的主要任务是什么
- 你在那里工作多久了

环境问题

- 根据您的经验, 当您在(platform mobility company) 工作时, 环境问题是一个重点吗?
- 您是否熟悉(platform mobility company) 为提高其运营的环境可持续性所做的工作?

扩展业务

- 获得(platform mobility company) 的主要动机是什么
- 你熟悉 (Didi 巴士, Didi 大脑...) 吗?
- 这项业务能否盈利?
- 为什么你认为他们扩展业务还包括公交服务
- 是否还有其他领域需要扩展其服务?

大数据

- 与地方政府分享哪些数据?
- 你熟悉 didi 大脑吗
- 迪迪布莱恩对政府关系有多重要
- 从迪迪汽车收集的数据在运输规划中起什么作用?
- 与地方政府分享的数据是否会以某种方式失去价值?
- 换句话说, 当与其他参与者共享时, 大数据的经济价值是否会发生变化?

法律问题, 政府关系

- 2017 年，关于 Didi 驾驶员（当地户口）和本地注册汽车的新规定，这对于滴滴来说有多大的挑战
- 滴滴用什么策略来加强与地方政府的关系？
- 您熟悉任何公私合作吗？
- 您是否熟悉哪些方法试图影响法规的结果？
- 滴滴是否在寻求对北京的交通规划产生影响，以防万一？
- 您是否有以前在政府部门工作过的同事？
- didi 的人是否与当地政府有密切联系？
 - 个人的职业关系？

盈利能力，一般

- 当时，盈利能力面临的主要挑战是什么？
- 此时，他们如何削减成本？
- 公司会比现在更重要或更重要吗？
- 您认为 (platform mobility company) 五年后会怎样？
- 他们的主要业务是什么，是否还会受到欢迎？

Appendix D: Project pitches

Two examples of changes in project pitches sent to expert interviewees.

Project pitch as of 20 March 2019

I am going to write PhD on smart transport systems in China, with a focus on Beijing. As a social scientist, my primary focus is understanding such systems as policy measures and the motivation for implementing such systems. I am also interested in how smart systems, if the case, are used to decrease pollution from the transport sector. Further, I am also particularly interested in how local governments are working together with ICT companies such as Didi and Alibaba to develop big data platforms and smart transport systems.

Project pitch as of 31 July 2019

I am currently conducting interviews on shared transport in China. I am planning to cover both topics related to user practices and also company strategies, government relations, and relevant regulations. It is, therefore, a research project aimed at understanding how shared transport has become a part of everyday life in China and the relation between public and private actors. A core question for me is to understand how these private actors can be regulated to enhance the sustainability of their business - my assumption is that shared transport services are not sustainable by definition but can be a part of a more sustainable transport system if integrated and regulated to enhance sustainability.

Appendix E: Overview of Interviewees

Overview of users and non-users: *Organized chronologically after the date of the interview. The dashed lines between names indicate that two interviewees were interviewed simultaneously. All of the user interviews where recorded.*

Pseudonym		Occupation/student status	Age	Gender	Place of origin
family name	given name				
Qiao	Jiayu	PhD candidate	late 20s	female	Liaoning
Li	Junqi	translator	mid 20s	female	Beijing
Zhang	Yuan	office cleaner (<i>Ayi</i>)	mid 40's	female	Sichuan
Feng	Minwen	office cleaner (<i>Ayi</i>)	mid 40's	female	Sichuan
Luo	Zijing	mid-manager, restaurant	mid 40's	male	Jiangsu
Bian	Di	waiter	19	male	Gansu
Song	Yifei	freelance writer	early 30s	female	Henan
Liu	Mingyu	in between jobs (previous: chef, insurance)	mid 20s	male	Hebei
Lin	Shu	Consultant	late 20s	male	Liaoning
Wang	Anan	master student/intern	early 20s	female	Heilongjiang
Zheng	Xuan	master degree	Early 20s	female	Heilongjiang
Chai	Guojiang	business owner	late 20s	male	Inner Mongolia
Zhang	Yunlong	Master student	late 20s	male	Hebei
Wu	Zhen	journalist/private company	late 20s	female	Taiwan/Shanghai
Chu	Xiaoyan	masters degree	early 20s	female	Hubei
Jia	Hui	internship	mid 20'es	female	Hebei
Wan	Zihan	previously bank	early 30s	female	Yunnan
Cheng	Yong	medical device company	early 40s	male	Hebei
Yang	Yu	store manager	late 30s	male	Beijing
No Pseudonyms, source in chapter 5		teacher	early 40s	female	Beijing

Overview of experts: *Organized chronologically after the date of the interview. The dashed lines between names indicate that two interviewees were interviewed simultaneously.*

Pseudonym		Company/occupation	Recorded
family name	given name		
Sun	Qingying	Didi, public transport division	x
Huang	Jiayi	Didi, intern, public transport division	x
Xie	Na	Didi, intern	x
Hu	Muyuan	University, professor, focus on planning	x
Schneider	Mathias	University, professor	x
Meng	Qishan	NGO, research/consultant	✓
Xia	Jing	NGO, research/consultant	✓
Di	Ziren	Research institute, professor	x
Liang	Jixing	Research institute, researcher	x
Pang	Zhenya	Anonymized company, legal expert	x
Dong	Zhenzhen	Anonymized company, legal expert	x
Cao	Yifan	Didi, media centre	✓
Xia	Zimeng	Anonymized, dockless pedelecs company	✓
Kuang	Mingjun	Research institute, transport planning and and cloud innovation	✓
Xue	Lina	Didi, transportation intelligence	✓
Ding	Liyang	Mobike, fyll inn	✓
Zheng	Tianhe	Didi, servers and data managment	✓
He	Guanjie	SOE, transport engineer	✓
Gu	Wenfeng	consultant	✓

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