

Restricted generalizability of city innovation policies: The case of E-hailing in China

Naubahar Sharif ^{1,*} and Jack Linzhou Xing²

¹Division of Social Science and Division of Public Policy, The Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong SAR, China and ²Hong Kong Institute for the Humanities and Social Sciences, The University of Hong Kong, May Hall, Pokfulam, Hong Kong SAR, China

*Corresponding author. Email: sosn@ust.hk

Abstract

Electronic-hailing (e-hailing) has experienced explosive growth in China. The Chinese government's e-hailing policies illustrate its central–regional policy mix. This study analyzes e-hailing policies in four Chinese cities—Xi'an, Chengdu, Beijing, and Guangzhou—and compares these policies with goals in four policy areas. We show that local Chinese governments' attitudes toward e-hailing are varied, contradictory, and in some cases even not in accordance with central government policies. Our insights demonstrate the limited generalizability of the policymaking experiments we studied. It would be difficult to infer broad policy implications from the experience any of the four cities has had with e-hailing, because China's regionally decentralized innovation system and policy experiment process address the unique needs and contexts of regional governments on a case-by-case basis.

Key words: e-hailing; innovation policymaking; policy experiments; China

1. Introduction

This study discusses the role of city governments in policy experiments in China. It analyzes the extent to which central government policymaking aligns across the city and national levels. Specifically, we analyze the complicated and contradictory electronic-hailing (e-hailing) policies that have been adopted in four Chinese cities—Xi'an, Chengdu, Beijing, and Guangzhou—to discuss the practical purpose of China's regionally decentralized innovation system and policy experiments.

E-hailing of rides enables a rideshare business to provide 'a single, or recurring rideshare trip with no fixed schedule, organized on a one-time basis, with matching of participants' (Amey et al. 2011: 103). In response to the recent explosion in e-hailing in China, the Ministry of Transportation delivered the national *Temporary E-Hailing Service Management Measures* (hereinafter referred to as the 'national *Measures*') in July 2016. These measures granted considerable autonomy to city governments to regulate the industry. Surprisingly, several cities have issued e-hailing regulations that contradict their own regulations in other policy areas as well as elements of the national *Measures*.

This research contributes to innovation policymaking studies in two ways. First, we expose a real—rather than ideal—picture of government attitudes to innovation in China, especially regarding new-economy innovations. We refute the common characterization

of China's innovation policymaking scene (at the macro, meso, and micro levels) as being either unfailingly receptive to new-to-China innovations or completely resistant to them. Instead, we show that cities' individual policy responses are complicated and inconsistent: complicated because they deviate to varying degrees from policy guidance issued by the central government, and inconsistent because their policy responses are sometimes inconsistent with their *own* development policy goals (as presented in the respective cities' *Five-Year Plans*).¹ Therefore, it is difficult, if not impossible, to draw generalizable conclusions regarding city governments' responses to innovation.

Second, we illustrate the practical purpose and consequences of China's decentralized policy experiments within the broader innovation system. We show that, ultimately, the city-level policy experiments we studied are not necessarily designed to provide lessons to be generalized to the national level (or to be implemented nationwide by the central government). Rather, permitting city-level policy experiments to play out serves the narrower purpose of enabling cities to devise and implement innovation policies that suit their unique needs in specific ways. Our examination of e-hailing policies shows that cities' needs vary widely, thus requiring their governments to customize the regulations issued by the central government. This makes it even more difficult for the central government to select, let alone uniformly promote, successful cases for dissemination across China.

This article is organized as follows. In the next section, we review the literature on China's innovation system and the agency exercised by city governmental bodies in innovation policymaking. Section 3 covers the methodology used in this research. In Section 4, we briefly compare the policies devised in the four cities and in Section 5, we analyze the policies of each of the four cities under study and discuss the possibility of treating these policies as policy experiments and generalizing them nationwide. In the last two sections, we discuss the implications of our findings and draw conclusions.

2. Literature review

Focusing on the policy responses of city governments to e-hailing, this study draws on, and contributes to, three streams of research that pertains to the following factors: Chinese governments' policy attitudes toward innovation, China's regionally decentralized innovation system and policymaking mechanism (reflecting the relationship between central and regional policies), and the role of regional governments in innovation systems.²

We found in our research that scholars have neither paid sufficient attention to specific Chinese government innovation *policies* nor attempted to study how a broader innovation policy is implemented in cities across the country (cf. Fu 2015a,b; Fuller 2016; Yip and McKern 2016). Studies that have addressed related questions too often conceptualize China as a homogeneous domain for innovation policymaking, oversimplifying, or glossing over inter-regional differences. Such oversimplification engenders misunderstanding of the purposes and consequences of maintaining a decentralized innovation system that allows city governments to adopt their own unique policies.

Most studies that have examined China's regionally decentralized innovation system and policymaking mechanism overemphasize the top-down nature of policymaking in China and exaggerate the role that such top-down policymaking plays. This approach is epitomized by Xu (2011), who argues that China adopts 'regionally decentralized authoritarianism', whereby regional governments are permitted to test policies that reflect their unique conditions, after which the central government selects successful cases and generalizes the policy nationwide. Xu argues that almost all major policymaking associated with China's economic and political reforms—such as land reforms, special economic zones, and the widespread establishment of township–village enterprises—has been subjected to this process. Xu's and similar studies often presuppose that policy experiments follow a linear model from launch to experiment to feedback to generalization, failing to elaborate on the practical purposes, and consequences of such experiments.³ As a result, these studies (1) apply primarily to traditional, easily identifiable policy areas—albeit areas with far-reaching consequences—not to new-economy or sharing-economy policymaking and (2) paint an oversimplified picture of how regional governments implement policies, missing the complexity of and inconsistencies that arise in the process.⁴

Finally, relevant research on the roles regional governments play in innovation systems focuses too narrowly on the actions of meso-level actors (such as city governments) in isolation (cf. Liu et al. 2011; Zhang 2016), failing to shed light on *interaction* between top-level and meso-level actors. Furthermore, they give relatively short shrift to the idea that the central government encourages regional policy experiments or, more generally speaking, to the status or function of regional governmental agencies (including their role in

regional policy responses) in innovation policymaking, particularly in China's large, multilayered, and complex innovation system.

The three gaps detailed above motivated the present research. Our investigation demonstrates the intra-city variation that results from the deployment of a decentralized policymaking system. We shed light on the objectives of policy experimentation. Methodologically, our study fills the two aforementioned gaps by studying mid-level regional governmental agencies.

3. Methodology

For our study, we selected four cities as cases. For each case, we conducted documentary and field research. To obtain valid comparisons, we selected cities based on the five following socioeconomic criteria.

Administrative rank: we chose provincial capitals with sub-provincial ranks as they had high enough ranks to enjoy maximum independence in formulating their own innovation strategies and policies. Beijing was included due to its special position as the state capital and its important policy implications for other Chinese cities.

Strategic position: we referred directly to the recognized categorization of Tier-1 and New Tier-1 cities as listed the 2016 *Chinese City Commercial Attraction Rank* produced by *China Business News Weekly* (Xiao 2016).

Socioeconomic situation: this was determined using gross domestic product (GDP) per capita, registered and permanent populations, and city district populations. All of our indicators were taken from the *China City Statistical Yearbook 2015*.

Geographical location: we selected cities to achieve a balance between near-coastal and inland cities.

Representativeness: to ensure robust coverage of city policy updates, we chose cities that are considered relatively important, famous, or familiar.

Based on the above criteria, we chose Xi'an, Chengdu, Beijing, and Guangzhou for our investigation. Further details regarding the selection and filtering process are provided in [Supplementary Appendix S1](#). The basic characteristics of the chosen cities are presented in [Table 1](#), and their geographical locations within China are indicated in [Supplementary Appendix S2](#).

For each of the four chosen cities, we conducted a content analysis of city government documents that relate to the city *Measures*. The documents were selected from government agencies that are in charge of affairs pertaining to e-hailing (see [Supplementary Appendix S3](#) for the list of agencies). Following the general categorization of documents by the city governments (see [Supplementary Appendix S4](#)), we selected and categorized relevant documents into the following policy areas related to e-hailing: population policy (P), innovation policy (I), traffic policy (T), and environmental policy (E).

We chose these four policy areas (and not others) for two reasons: First, we selected areas from functional city policy areas that we considered relevant to e-hailing (e.g. policy areas such as food and drug security, water security, and agriculture and forestry struck us as irrelevant to e-hailing).⁵ E-hailing is a technologically innovative business related to traffic that requires large inputs of labor. In this sense, we consider the following policies to be relevant to e-hailing policies (the list is not exhaustive): policies involving human resources and social security, development, and reform; traffic policies involving construction, planning, and transportation; and innovation policies, involving industry and information, industry and

Table 1. Basic information about and criteria for selecting the four cities

Criteria City	Rank	Strategic position ⁶⁷	GDP per capita (Yuan)	Registered population (10,000) ⁶⁸	Permanent population (10,000) ⁶⁹	City district population (10,000) ⁷⁰	Location
Xi'an	Provincial capital, sub-provincial	New Tier-1	63,794	815.3	846.8	587.2	Inland
Chengdu	Provincial capital, sub-provincial	New Tier-1	70,019	1210.70	1404.76	581.6	Inland
Beijing	State capital	Tier-1	99,995	1333.4	1961.2	1261.9	Near-coastal
Guang-Zhou	Provincial capital, sub-provincial	Tier-1	128,478	842.4	1270.08	695	Near-coastal

Note. Statistics as of 2014.

commerce, development and reform, and science and technology. Insofar as traffic issues are closely related to the need to reduce air pollution, environmental policies are also relevant. Other policy areas are excluded, however, as they are considered at best indirectly related to e-hailing. Second, city government documents that relate to the city *Measures* themselves mention P, I, T, and E most frequently.

Documents unrelated to at least one of these four policy areas were excluded from our analysis. The final sample consisted of 240 documents, covering the period of 25 May 2011 to 19 July 2017 (see [Supplementary Appendix S5](#) for a list of all of the documents included in our analysis).

We analyzed the selected documents, and compared each city's e-hailing policy goals with its summarized city policies in the P, I, T, and E policy areas. Based on the principles detailed in [Fig. 1](#), we assigned scores to these two sets of goals (namely, city e-hailing policy goals on the one hand and city policy goals on the other) in each of the four policy areas.⁶

After assigning scores, we conducted multiple sets of comparisons between each city's policy goal scores and city *Measures* scores. Generally speaking, for each policy implemented by each city, the closer the scores are to one another, the more closely the goals of the city e-hailing *Measures* are aligned with the city's policy goals.

Additionally, we conducted semi-structured, in-depth interviews with e-hailing drivers and taxi company managers from August 2017 to February 2018 (see [Table 2](#)). These interviews supplemented the findings of the documentary analysis regarding the potential outcomes of innovation policies. Each interview lasted from 30 min to 1 h, and the interview content was recorded in writing. Interview questions covered the interviewees' awareness of national *Measures* and city *Measures*, their views of the strictness of the *Measures*, the consequences of the *Measures* for their businesses and business decisions. Answers to these questions were categorized in accordance with the four policy areas (P, I, T, and E).

4. E-hailing *Measures*: from national *Measures* to city *Measures*

In July 2016, the final draft of *Temporary E-Hailing Service Management Measures* was released. This document is the most recent national policy on e-hailing in China. Unlike the exposure draft, it offered freedom in two respects.⁷ First, it offered wide latitude regarding the registration and operation of e-hailing businesses. Second, it gave city governments considerable autonomy. It stated that city governments should issue concrete regulations, but its guidelines encourage cities to adopt policies that express a generally

less stringent and more open attitude towards e-hailing. This stands in sharp contrast to earlier policies regulating other internet-related sectors.⁸

Surprisingly, however, the city *Measures* imposed generally tighter restrictions on the e-hailing business, contrary to the national *Measures*. Additionally, the city *Measures* differed starkly from each other, as shown in [Table 3](#), where we summarize the regulations comprising the *Measures* adopted in Xi'an, Chengdu, Beijing, and Guangzhou.

Broadly speaking, each city restricts the e-hailing business along two dimensions: driver eligibility (such as driver identification requirements), and technical requirements for vehicles (wheel base, length, width, height, displacement, fuel source, etc.). Requiring drivers to obtain city *hukou* is considered strict. When technical requirements require that a vehicle's wheelbase be more than 2,700 mm or that its engine displacement be more than 1.8 T/2L (regarded as the baseline for high-end cars in the Chinese urban market ([Qdaily 2016](#))), it is considered strict.⁹

Finally, we adopt three categories, ranging from the most restrictive, which we label 'strict', to the least restrictive, which we label 'less stringent', separated by a middle category we label 'moderate', to classify e-hailing regulations. We use *driver eligibility* and *technical vehicle requirements* to categorize the cities under study. If a driver needs to possess a city *hukou*, then we categorize the dimension as 'strict'. If a driver needs merely to possess a city's residential permit, then we categorize the dimension as 'less stringent'. If a city government imposes a size requirement (regarding the wheel base, or a car's overall length, width, or height), then a displacement requirement on an engine's cylinders of >1.8 T/1.75 L, or requires all e-hailing vehicles to be new-energy cars, it is labeled 'strict.' If a city government does not impose a requirement on either the size or displacement of cars and does not require cars to use new-energy sources, then we classify it as 'less stringent.' Based on these dual dimensions, if a city adheres strictly to driver eligibility requirements and technical vehicle requirements, then we classify it as 'strict' overall. If a city is strict along only one of those two dimensions (driver eligibility or technical requirements), then we classify it as 'moderate' overall. If a city is not strict along either of the two dimensions, then we classify it as 'less stringent' overall. The overall categorizations appear in the bottom row of [Table 3](#).

The two dimensions along which e-hailing is restricted (driver eligibility and technical vehicle requirements) are also related to the cities' goals within the four policy areas. In terms of population policy (P), driver eligibility is directly linked to whether individuals from outside the jurisdiction are permitted to participate in e-hailing, and the technical requirements for vehicles determine whether

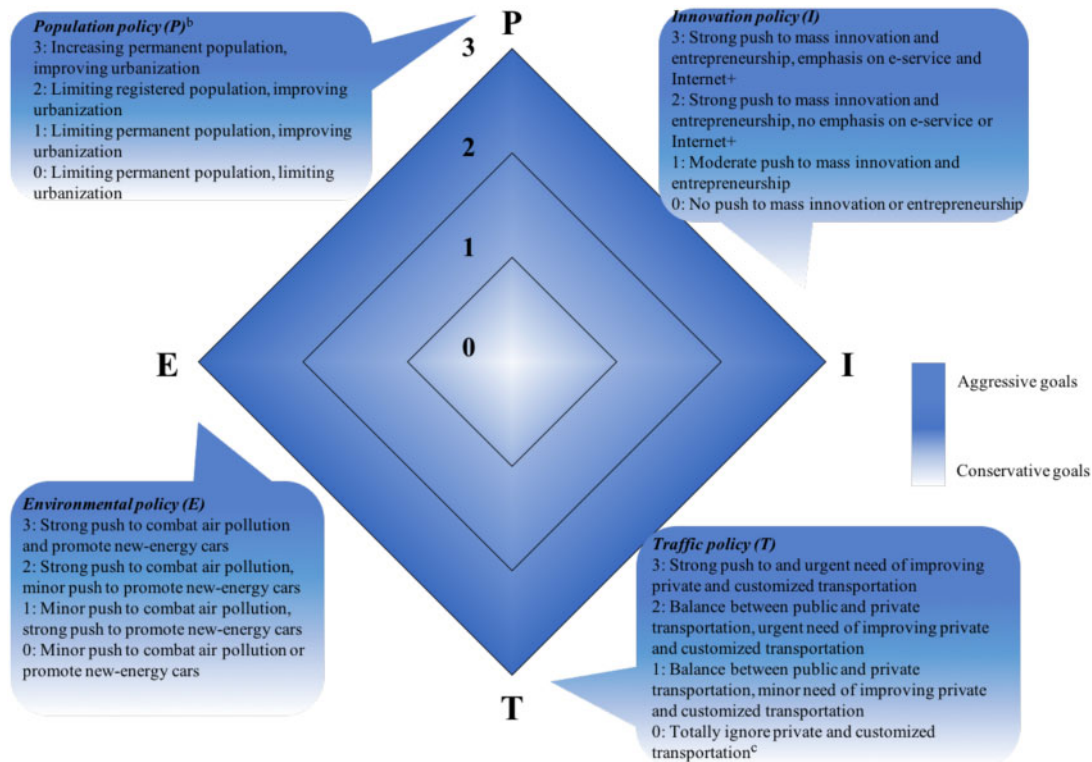


Figure 1. Criteria for assigning scores to policy goals and the goals reflected in city *Measures*. ^aFor illustration purposes, if a city has a strong policy goal of promoting population growth, it will receive a high score (such as a score of 3) for the population policy (P) area (dark shading). We compare this policy goal score against e-hailing scores. If the city's e-hailing policy indicates a goal of promoting population growth (e.g. by imposing less stringent limitations on e-hailing and welcoming outsiders to engage in e-hailing), the city's e-hailing policy goal will receive a high score for the population policy (P) area. If the city's e-hailing policy indicates a goal of limiting population (e.g. by requiring that drivers hold city *hukou*), that city's e-hailing policy goal will receive a low score in the P area; a low e-hailing policy goal score and a high city policy goal score indicates inconsistencies in a particular policy area (of P, I, T, or E). In terms of the scoring rubric, the rationale for assigning scores to each of the four areas is as follows: For Population Policy (P): the basic goals are to limit or increase certain populations. Because e-hailing does not involve high-level education or skill requirements, we chose the most general categories of population indicators: the registered and permanent populations. Moreover, as e-hailing is applied most often in urban areas, we adopted urbanization as another indicator in P. For Innovation Policy (I): the e-hailing business model requires drivers to work as small independent entrepreneurs and sole proprietors, so we adopted the push to mass innovation and entrepreneurship as one indicator in I. As e-hailing is a typical e-service and Internet+ industry, incorporating online and offline services, we adopted the emphasis on e-service and Internet+ as another indicator. Other aspects such as R&D investment and industry modernization focus more intently on local-originated hi-tech development, and thus are less relevant. For Transportation Policy (T): e-hailing utilizes a private means of transportation, so the policy orientation choice between public and private means of transportation is relevant. Moreover, as e-hailing represents the trend toward customized transportation, any policy orientation towards such transportation is relevant. For Environmental Policy (E): almost all vehicles cause air pollution, and one of the strategies for combating air pollution involves limiting the number of fossil fuel vehicles, so a policy push to combat air pollution is relevant to the development of e-hailing. Another more positive way of addressing the vehicle problem is to encourage the adoption of new-energy cars. Therefore, we consider the promotion of new-energy cars another indicator. ^bBecause a city's permanent population is a more concrete measure of its real population than its registered population is, increasing or limiting the permanent population would indicate a stronger policy push for limiting the population or attracting new residents than increasing or limiting the registered population would. ^cSuch as taxicabs and e-hailing.

Table 2. Numbers and types of informants interviewed

Cities Interviewees	Xi'an	Chengdu	Beijing	Guangzhou	Total
E-hailing drivers	18	14	15	14	61
Taxi company managers	15	14	13	13	55

low-income rural migrants can afford to buy their own cars to use e-hailing as a source of revenue. In terms of innovation policy (I), driver eligibility is related to whether a city expresses an encouraging attitude to micro-entrepreneurship among its citizens. In terms of traffic policy (T), driver eligibility and technical requirements for cars influence whether the city can effectively boost or limit private vehicle numbers and drivers. In terms of environmental policy (E),

driver eligibility and technical requirements for cars determine whether emissions control is important and effective.

5. Relationship between e-hailing policy and related policy areas (P, I, T, and E) in four cities

In this section, we analyze the relationship between e-hailing policies and related policy goals within four policy areas (P, I, T, and E) in the four cities under study.

5.1 Xi'an

Xi'an's e-hailing policy is significantly inconsistent with its policy goals in all the four related policy areas.

Table 3. Summary of practical regulations of the four city *Measures*

Cities Regulation	Xi'an	Chengdu	Beijing	Guangzhou
Price setting	Government-guided	Market	Government-guided	Market
Driver eligibility	Xi'an <i>hukou</i>	Chengdu residential permit	Beijing <i>hukou</i>	Guangzhou residential permit
Technical vehicle requirements				
Wheel base	≥2,700 mm	– ^a	≥2,700 mm	–
Length	≥4,850 mm	–	–	≥4,600 mm
Width	≥1,810 mm	–	–	≥1,710 mm
Height	≥1,450 mm	–	–	≥1,420 mm
Displacement	1.8 T/2–3 L	≥1.4 T/1.6L	≥1.8 T/2 L	≥1.75 L
New-energy car ^b	Wheel base ≥2,650 mm; range ≥250 km		Wheel base ≥2,650 mm	Wheel base ≥2,650 mm; range ≥100 km
Summary of regulations	Strict	Less stringent	Strict	Moderate

^a. '–' stands for 'no requirement'.

^b. Special regulations applying to cars using renewable energies including hydro power and electricity. In practice, it refers mostly to electric cars.

5.1.1 Population policy (P)

Population growth has been a key goal for boosting Xi'an's economic development given its relatively small population (see Table 1). In 2016, Xi'an established the goal of achieving a permanent population of 10,707,800 by 2020¹⁰; at the end of 2015, its permanent population was 9,000,000.¹¹ Xi'an did not, however, set any target or place for any limitations on its registered population. The city also tried to increase urbanization (as measured by the percentage of its population living in urban settings). In 2011, Xi'an set its urbanization target at 75 per cent, an increase from its 2010 urbanization rate of 70 per cent.¹² To achieve this goal, it eased up on *hukou* eligibility rules, abolishing the segregation of agricultural from non-agricultural *hukou* and simplifying the *hukou* registration procedure.¹³

Xi'an *Measures* seem inconsistent with its population growth goal. The *Measures* require e-hailing drivers to obtain Xi'an *hukou* or resident permits (see Table 3), which is difficult to do, making it impossible for immigrants to work as e-hailing drivers in Xi'an, thus forfeiting the opportunity to use e-hailing to attract new residents from outside the current population. Second, the strict technical requirements imposed on cars in Xi'an (see Table 3) exclude low-to-medium-end cars and thus poorer migrants, who generally cannot afford the high-end cars that would be eligible. With this in mind, we assign a score of 3 to Xi'an's population policy (P) goal and a score of 1 to Xi'an *Measures*.

5.1.2 Innovation policy (I)

As is the case in other Chinese cities, promoting innovation is a major development focus in Xi'an. In terms of macro-level plans, as early as 2011 and 2012, Xi'an began promoting indigenous innovation.¹⁴ In terms of e-services and Internet+, in 2012, the city set a target of 2015 e-service industry income of RMB40 billion.¹⁵ In 2016, it promoted Internet+ industries with an emphasis on Internet+ traffic services (including e-hailing).¹⁶ Moreover, to facilitate mass entrepreneurship, in 2014, Xi'an simplified the requirements and procedures for small and micro company registration.¹⁷ In 2016, it further emphasized the promotion of mass entrepreneurship.¹⁸

Ideally, as an important e-service and Internet+ innovation, e-hailing should be welcomed by Xi'an. The actual policies are, however, contrary to this attitude (Fu 2016a,b; Huashang News 2016; Tao 2016). Xi'an's extremely stringent *Measures* seriously harm

e-hailing as well as other Internet+ service business. Furthermore, such unfriendliness toward an industry in which drivers are *de facto* quasi-entrepreneurs is inconsistent with the city's goal of facilitating entrepreneurship. With this in mind, we assign a score of 3 to Xi'an's policy goal for its innovation policy (I) and a score of 2 to its *Measures*.

5.1.3 Traffic policy (T)

Like many other Chinese cities, Xi'an prioritizes public transportation and regards taxi services as supplemental. It made this principle explicit in 2011 and added the goal of becoming a 'Public Transportation City' by 2016.¹⁹ In practice, in 2015, the target number of buses per 10,000 people was 18,²⁰ and in 2016, six subway lines were completed.²¹ Positioning taxi services as supplemental did not, however, mean ignoring private and customized transportation. Xi'an ordered annual increments of 445 new taxi licenses between 2012 and 2016,²² resulting in roughly 12,000 licensed taxis by 2016 (Jia 2016). In this context, several policies adopted in 2014 and 2015 pushed for the standardization of the taxi industry.²³

In this area, Xi'an *Measures* are in line with the city's policy orientation for traffic planning. Insofar as taxis supplement rather than represent a core component of the broader transportation network, it is consistent that e-hailing services—such as licensed taxi services—are not enthusiastically welcomed. Nevertheless, for the taxi industry as a whole, Xi'an's *Measures* demonstrate elements that are inconsistent with the city's transportation policies. First, the number of taxis per 10,000 people in Xi'an is relatively low, 13.78 in 2016, which is far below the standard of 20 established by the Ministry of Housing and Urban–Rural Development in 1995 (Jia 2016). Therefore, e-hailing could help the taxi industry achieve this target; however, Xi'an *Measures* reduce this possibility. Second, as a way of making transportation more 'intelligent', e-hailing is in line with the policy goal of enhancing marketization and making the traffic system more intelligent. By overly limiting its development, however, Xi'an *Measures* are inconsistent with such goals. With this in mind, we assign a score of 2 to Xi'an's policy goal for its traffic policy (T) and a score of 1 to Xi'an *Measures*.

5.1.4 Environmental policy (E)

Xi'an has been trying very hard to combat its serious air pollution problem. The goals of reducing haze and controlling automobile

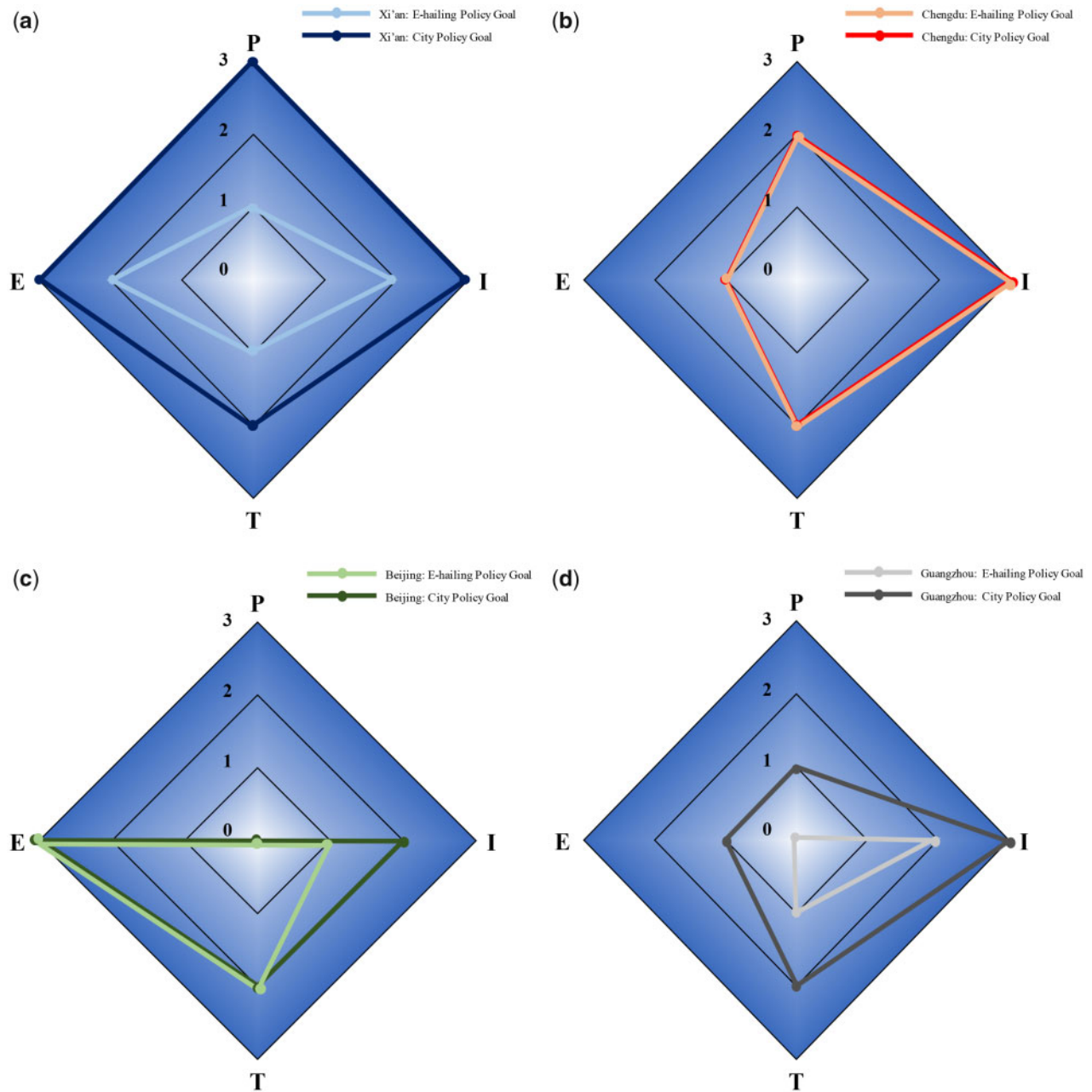


Figure 2. (a) Xi'an: comparison between e-hailing policy goal and city policy goals. (b) Chengdu: comparison between e-hailing policy goal and city policy goals. (c) Beijing: comparison between e-hailing policy goal and city policy goals. (d) Guangzhou: comparison between e-hailing policy goal and city policy goals.

emissions are repeatedly seen in policy documents in the period running from 2011 to 2016.²⁴ Since 2015, Xi'an has arranged for annual haze-reducing activities that emphasize controlling the number of automobiles on city roads. Furthermore, it has promoted 'new-energy' automobiles that produce lower or environmentally harmless emissions. These ideas are best illustrated by Xi'an's policies for promoting the new-energy car industry (starting in 2011), promoting new-energy buses (starting in 2017), and constructing new-energy car-charging facilities (starting in 2017).²⁵

Controlling the number of automobiles on the roads is one potential impact of Xi'an *Measures*, which is in line with the policy goal of combatting air pollution. However, the strict limitation on e-hailing new-energy cars (see Table 3) is inconsistent with the

policy goal of promoting such cars. With this in mind, we assign a score of 3 to Xi'an's policy goal for its environmental policy (E) and a score of 2 to Xi'an *Measures*.

5.1.5 Summary

Xi'an *Measures* are clearly inconsistent with the city's policy goals for population and innovation and partially inconsistent with its traffic and environmental goals (see Fig. 2 (a)). This conclusion is supported by the evidence gathered from interviews with Xi'an e-hailing drivers, the majority of whom cannot understand why Xi'an so strictly limits e-hailing, as it is a potential channel for attracting new residents, encouraging innovation, and diversifying

the traffic system. This situation makes Xi'an an illustration of the complexity of city governments' attitudes to innovation: Xi'an *Measures* are inconsistent with its own policy goals in related areas. This inconsistency is especially high for e-hailing—an innovative industry requiring governance.²⁶

5.2 Chengdu

In sharp contrast to Xi'an, especially given their similar geographical and strategic positions (as shown in Table 1), Chengdu has developed much less stringent city *Measures*.

5.2.1 Population policy (P)

Given Chengdu's large registered population (see Table 1), in 2012, it imposed a limit on its 2016 registered population of 12.6 million people, which represents a small increase over the 2011 registered population of 11.435 million.²⁷ Chengdu did not, however, impose any limitations on its permanent population. Second, given its still small city–district population (see Table 1), Chengdu has been trying to increase urbanization. In 2016, when the urbanization rate was 70 per cent, it targeted an urbanization rate of 77 per cent by 2020.²⁸ To achieve this rate, between 2012 and 2016, it tried to guide its rural population to urban employment, especially in the services industries.²⁹

Chengdu *Measures* and its population policies are generally consistent. The identification requirements imposed on e-hailing drivers regarding Chengdu *hukou* or residential permits echo the goal of limiting the registered population. The weak technical requirements imposed on e-hailing cars (see Table 3) make it easy for rural Chengdu citizens to offer e-hailing services, meeting the desire to increase both urbanization and service–industry expansion. With this in mind, we assign a score of 2 to Chengdu's policy goal for its population policy (P) and a score of 2 to Chengdu *Measures*.

5.2.2 Innovation policy (I)

Like the other cities under study, Chengdu has made promoting innovation industries and infrastructure one of its major goals. In terms of macro plans, the *Chengdu 12th and 13th Five-Year Plans* identify building an innovative city as a major goal. In practice, Chengdu has promoted e-services and Internet+ businesses since 2012, calling for more e-commerce and building a model e-commerce city.³⁰ Furthermore, to promote mass entrepreneurship and innovation, Chengdu simplified firm registration procedures and enhanced consultation and training service provisions in 2015 and 2017.³¹

Chengdu *Measures* are perfectly consistent with the city's innovation policy goals. As an important e-service and Internet+ innovation in which drivers are quasi-entrepreneurs, e-hailing has been enthusiastically welcomed in Chengdu. With this in mind, we assign a score of 3 to Chengdu's policy goal for its innovation policy (I) and a score of 3 to Chengdu *Measures*.

5.2.3 Traffic policy (T)

An emphasis on public and rail transportation is an essential component of traffic planning in Chengdu, as it is in the other cities in our study. In 2013, Chengdu established a goal of incrementally increasing the number of buses in operation to 8,000 and the length of its subway system to 150 km between 2013 and 2017.³² In 2016, it adopted the goal of becoming a 'public transportation city' with a 'comprehensive public transportation system with different functions of lines.'³³ In terms of private and customized transportation,

in 2013, Chengdu started building a multi-level transportation system by promoting phone-hailing and intelligent taxis, stressing the importance of combining Internet+ and taxi services.³⁴

Superficially, Chengdu *Measures* seem to be inconsistent with the goal of promoting public transportation. Supporting e-hailing is, however, in line with the goal of diversifying transportation, especially insofar as Chengdu suffers from a low taxi-to-rider ratio of 12/10,000, well below the national standard of 20 (Jia 2016). By allowing e-hailing, Chengdu is developing the diversity, comprehensiveness, and intelligence of its transportation system. With this in mind, we assign a score of 2 to Chengdu's policy goal for its traffic policy (T) and a score of 2 to the Chengdu *Measures*.

5.2.4 Environmental policy (E)

Air pollution in Chengdu is not serious, and its environmental regulations are correspondingly less stringent than in other cities that suffer from higher levels of pollution. In 2012 and 2015, policy items included appropriately controlling the number of automobiles and lowering off-gas emissions, but practical policies never went beyond traffic restrictions in parts of the central urban area.³⁵ However, Chengdu worked hard to promote new-energy automobiles as a way of controlling off-gas emissions. Multiple policy plans in 2012 and 2014 made promoting the new-energy automobile industry a very important goal.³⁶ Recently, this goal was reiterated in new policy documents.³⁷

Chengdu *Measures* are in line with the city's environmental policy goal. As air pollution is not strongly emphasized, Chengdu can stay in line with the goal while being friendly to e-hailing automobile services. Furthermore, with almost no limitations on the use of new-energy vehicles in e-hailing (see Table 3), Chengdu *Measures* support a positive practical element in the city's efforts to promote new-energy cars. With this in mind, we assign a score of 1 to Chengdu's policy goal for its environmental policy (E) and a score of 1 to Chengdu *Measures*.

5.2.5 Summary

Based on the above analysis, we find that Chengdu *Measures* are in line with Chengdu's city policy goals (see Fig. 2(b)). This result is consistent with the results of our interviews with e-hailing drivers in Chengdu, many of whom come from rural areas around the city and have managed to start innovative businesses as e-hailing drivers. Nevertheless, this good fit does not validate the *Measures* as a potentially generalizable version of the policy experiment. First, Chengdu *Measures* are based on the city's unique features, such as its large rural population and almost non-existent air quality problem. These characteristics mean its policies are suitable only in this context. Furthermore, the sharp differences between Chengdu's and Xi'an's *Measures* indicate that two cities, even if they have similar geographical and socioeconomic situations, can have very different underlying concerns and policymaking procedures and therefore follow distinct logical principles in policymaking. This means that policy generalization cannot be an outcome of the central government's policy experiment in Chengdu.

5.3 Beijing

As the capital city, Beijing has a very special position and contends with unique city development problems. Therefore, Beijing *Measures* generally echo the city's policy goals, with minor inconsistencies.

5.3.1 Population policy (P)

Beijing is famous for its crowding, and its population policy focuses accordingly on population control. In 2016, Beijing made population control a goal, and set a target for its permanent population of under 23 million people in 2020,³⁸ a small increase from the 2016 permanent population of 21.729 million (Beijing Statistics Bureau 2017). Moreover, in 2016, by directing population outflow to suburban areas and establishing an outside-talent point system, Beijing tried to limit urbanization, especially in the central urban area.³⁹

Extreme population pressure has led Beijing to strictly limit its population in any way it can. Thus, Beijing *Measures* are comparatively strict regarding e-hailing as a population inflow channel; only *hukou* owners, who are rarely newcomers, can be e-hailing drivers (see Table 3). With this in mind, we assign a score of 0 to Beijing's policy goal for its population policy (P) and a score of 0 to Beijing *Measures*.

5.3.2 Innovation policy (I)

As China's capital city, Beijing strongly promotes innovation, as do the other cities in our study. However, Beijing emphasizes scientific and technological innovation rather than e-service and Internet+ innovation. From 2011 to 2016, service-industry promotion was always peripheral, while promotion of 'scientific and technological innovation' was a central goal.⁴⁰ One minor example of the promotion of e-services and Internet+ is reflected in Beijing's facilitation of mass entrepreneurship in Internet+ businesses and its systematic support for innovative startups.⁴¹

Beijing's *Measures* are generally consistent with the city's innovation policies. Although the strictness of the Beijing *Measures* (see Table 3) is inconsistent with the promotion of innovation and mass entrepreneurship in general, it is consistent with its stated goals, as e-services and Internet+ are not major components of Beijing's innovation goals. With this in mind, we assign a score of 2 to Beijing's policy goal for its innovation policy (I) and a score of 2 to Beijing *Measures*.

5.3.3 Traffic policy (T)

The emphasis on public transportation, in particular rail transportation, in Beijing's traffic planning is similar to that of other cities. In 2012, it set the goal of having public transportation make up 50 per cent of trip choices for riders.⁴² In 2016, it issued a new slogan supporting the building of a 'Public Transportation City'.⁴³ To develop private and customized transportation, Beijing worked on developing intelligent and Internet+ traffic systems.⁴⁴ Nevertheless, the major practical effort in this area lies in licensed taxi services, which is a quasi-monopolized industry run by the government and easy to manage. In 2012, Beijing established a goal of maintaining 66,000 taxis until 2015 and enhancing the quality of licensed taxi services.⁴⁵ These goals have largely been met as the number of taxis in Beijing was 66,648 in 2016 (Jia 2016).

Beijing *Measures*, then, generally fit Beijing's traffic policies, despite what seem like overly strict technical requirements for cars (see Table 3). Unlike the other cities under study, Beijing has maintained a steady supply of licensed taxis at least over the 12th 5-Year period (2011–2016). The number of taxis per 10,000 people in Beijing is 30.71, much higher than the national standard given by the Ministry of Housing and Urban-Rural Development⁴⁶ (Jia 2016). Therefore, it makes sense that Beijing does not encourage e-hailing as an alternate to licensed taxis. With this in mind, we assign a score

of 1 to Beijing's policy goal for its traffic policy (T) and a score of 1 to Beijing *Measures*.

5.3.4 Environmental policy (E)

Beijing suffers from high levels of air pollution and has therefore sought to control the number of automobiles and off-gas emissions. The goal of controlling off-gas emissions appeared as early as 2012 and was put into practice with multiple traffic regulations.^{47,48} These principles and regulations were all recently reiterated in 2016.⁴⁹ Between 2011 and 2015, Beijing labored mightily to promote new-energy cars to combat off-gas emissions.⁵⁰ It has adopted practical strategies such as encouraging the building of charging stations for electric cars and subsidizing new-energy vehicle manufacturers.⁵¹

Beijing *Measures* perfectly fit the city's environmental protection goals. By exercising very strict control over e-hailing services, especially those using gasoline-burning cars, Beijing's *Measures* can help it control off-gas emissions. In contrast, Beijing regulates the technical indicators of new-energy cars less stringently (see Table 3), which strongly echoes its general support of new-energy cars. With this in mind, we assign a score of 3 to Beijing's policy goal for its environmental policy (E) and a score of 3 to Beijing *Measures*.

5.3.5 Summary

As China's capital city, Beijing is distinguished by massive population pressure, an emphasis on scientific and technological innovation rather than service innovation, a well-developed taxi system, and high levels of air pollution. Together, these characteristics are addressed in the city *Measures*, which are consistent with the city's policy goals (see Fig. 2 (c)). These findings are reinforced by our interviews with Beijing taxi company managers, the majority of whom are satisfied with the Beijing *Measures* and claim that licensed taxis are sufficiently numerous in Beijing given its population pressure, long-term effort to develop licensed taxi services, and air pollution problems. These distinct, although reasonable, policies seriously impact the generalizability of Beijing *Measures*, which serve Beijing's ends alone.

5.4 Guangzhou

The Guangzhou *Measures* impose moderate regulations compared with those of Chengdu (which are less stringent) and Beijing (which are stricter).

5.4.1 Population policy (P)

As one of the most populous cities in China (see Table 1), Guangzhou has adopted a population policy that is not as strict as those devised for similar large cities such as Beijing. Guangzhou's first goal is to control the permanent population. In 2017, it set a target for its permanent population of under 15.5 million people in 2020; its 2015 permanent population was 13.5 million.⁵² Given its moderate city district population (see Table 1), however, Guangzhou has tried to increase urbanization. To achieve this, in 2014, it simplified the rural-urban *hukou* transfer procedures,⁵³ and in 2017 it set a target urbanization rate of 86.05 per cent by 2020; its 2015 urbanization rate was 85.53 per cent.⁵⁴

These factors justify Guangzhou's policy of requiring potential drivers to obtain residential permits while keeping the other conditions simple to encourage existing rural residents to take up e-hailing. Nevertheless, given the city's goal of raising its urbanization rate, the technical requirements imposed on cars (see Table 3) are

still slightly too strict. With this in mind, we assign a score of 1 to Guangzhou’s policy goal for its population policy (P) and a score of 0 to Guangzhou *Measures*.

5.4.2 Innovation policy (I)

Guangzhou works hard to promote innovation. In its macro plan, it adopted a slogan relating to constructing a national innovative city by 2013,⁵⁵ and added a new slogan, the ‘Capital of Innovation’, in 2017.⁵⁶ In 2012, Guangzhou began emphasizing e-services and Internet+ as a key strategic industry.⁵⁷ In 2015 and 2017, it emphasized the goal of promoting e-commerce and becoming an exemplary national e-commerce city.⁵⁸ To encourage mass entrepreneurship, Guangzhou provides a range of services, funding, and incubation opportunities to e-commerce startups, which are specified in various policies enacted between 2013 and 2016.⁵⁹

Guangzhou’s innovation policy goal and its *Measures* are generally in line with each other, but there are some inconsistencies. For a city that emphasizes e-services and Internet+ innovation, Guangzhou appears to have adopted driver-friendly eligibility requirements (see Table 3), but the multiple technical requirements it imposes on cars are very strict (see Table 3). This makes the underlying policymaking logic confusing. With this in mind, we assign a score of 3 to Guangzhou’s policy goal for its innovation policy (I) and a score of 2 to Guangzhou *Measures*.

5.4.3 Traffic policy (T)

Like the other cities in our study, Guangzhou emphasizes public transportation, targeting a rate of 70 per cent of motor vehicle trip choices for using public transportation.⁶⁰ In 2016, it further specified the importance of railway transportation.⁶¹ Guangzhou also tries to incorporate Internet+ customized transportation into public transportation, as specified by policies in 2015 and 2016.⁶² Moreover, in 2016, Guangzhou reiterated the goals of enhancing taxi service quality and its supervision and examination system for taxi service quality.⁶³

Guangzhou *Measures* follow Guangzhou’s traffic policies’ balanced emphasis on public and private transportation. The less stringent requirement regarding drivers’ *hukou* status (see Table 3) facilitates the goal of improving private and intelligent transportation, whereas the technical requirements imposes on cars (see Table 3) reasonably control e-hailing’s impact on public transportation. With this in mind, we assign a score of 2 to Guangzhou’s policy goal for its traffic policy (T) and a score of 1 to Guangzhou *Measures*.

5.4.4 Environmental policy (E). Like Chengdu, but unlike Beijing and Xi’an, Guangzhou does not suffer from significant air pollution, which is therefore not strongly emphasized in its environmental policies. Guangzhou’s traffic-related environmental policies focus on emissions supervision and promoting public transportation rather than on controlling the number of vehicles on its roads, as shown in multiple relevant policy documents from early 2013.⁶⁴ In contrast, Guangzhou heavily promotes new-energy cars to control off-gas emissions. In 2013, it identified the new-energy car industry as a key resource for combatting air pollution.⁶⁵ Between 2013 and 2015 period, various policies were issued promoting the production and application of new-energy cars, including subsidizing manufacturers, constructing electrical charging stations, and increasing the percentage of new-energy buses.⁶⁶

It is reasonable for Guangzhou to adopt a moderate e-hailing policy as it has only a moderate need to control the number and

types of vehicles that run on its roads. However, the Guangzhou *Measures* still impose a range of requirements on new-energy cars used in e-hailing (see Table 1), despite its strong promotion of such cars. With this in mind, we assign a score of 1 to Guangzhou’s policy goal for its environmental policy (E) and a score of 0 to Guangzhou *Measures*.

5.4.5 Summary

Guangzhou *Measures*, consistent with the city’s policy goals, are relatively moderate. This is also reflected in our interviews with Guangzhou e-hailing drivers and companies, who reported that they had experienced very limited impact, either positive or negative, as a result of Guangzhou *Measures*. This moderation is generally in line with its city policy goals, including moderate population-control efforts, dual emphasis on public and private transportation, and normal air quality. Guangzhou *Measures* are, however, also somewhat inconsistent with the city’s stress on e-services, Internet+, and new-energy cars (see Fig. 2 (d)). The moderate nature of the problems with which the city contends, and the resulting moderate e-hailing policies, would be difficult to generalize nationwide. Therefore, again, Guangzhou’s policymaking mix serves its own local ends.

We conducted robustness checks of the scores we assigned to the city and e-hailing policy goals by cross-checking them with, and seeking support from, relevant reports and policy analysis issued by business consultancy agencies, research institutes, and other sources. We report the results of our robustness checks in Supplementary Appendix S6.

6. Discussion

We obtain three key takeaways from the above analysis. First, we see that each of the four cities selected for our study has its own unique city *Measures*, and each city’s *Measures* are related to varying policy goals in the P, I, T, and E areas. As Fig. 3 shows, the Xi’an *Measures* are not aggressive in any of the four related policy areas, whereas Chengdu *Measures* are aggressive in I, but moderate in E. Beijing *Measures* are conservative in P, whereas Guangzhou *Measures* are conservative in both P and E.

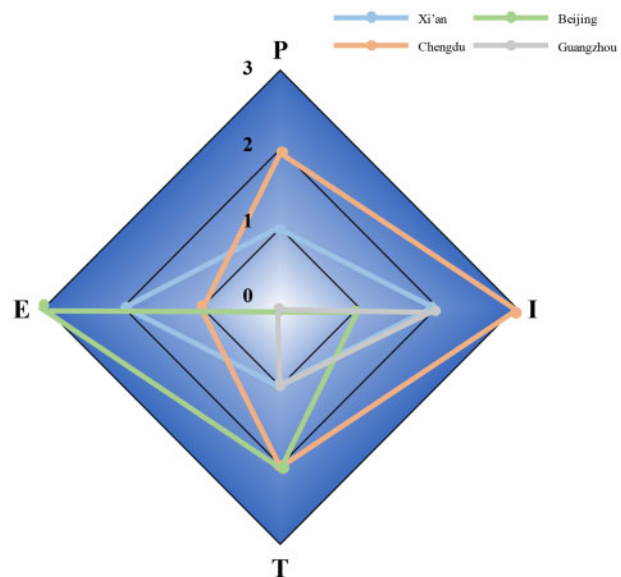


Figure 3. Comparison between e-hailing policy goals, four cities.

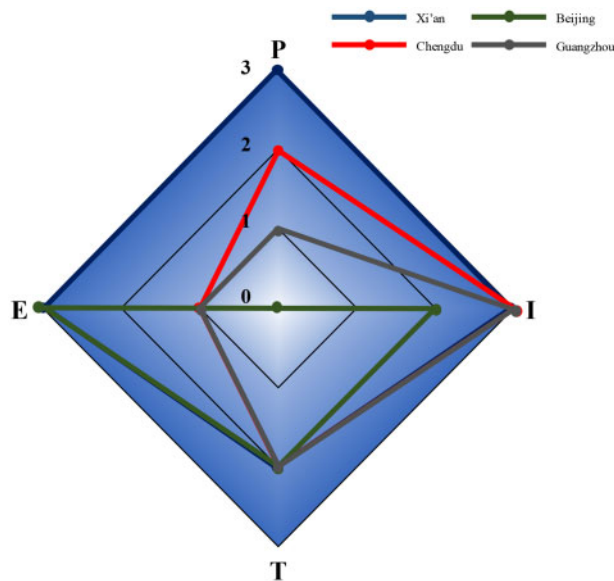


Figure 4. Comparison between city policy goals: four cases.

Second, each of the four cities has its own unique city policy goals in the four policy areas, implying that the factors that inform city *Measures* differ radically across the four cities. As Fig. 4 shows, Xi'an's city policy goal is aggressive in P, I, and E, whereas Chengdu's is aggressive in P but moderate in P, T, and E. Beijing is very conservative in P but aggressive in E, whereas Guangzhou is aggressive in I but moderate in P, T, and E. The cities do not share similar city policy goals, reflecting their unique characteristics, and therefore do not share specific policies.

Finally, combining the entire picture of the four cities' policy goals and their e-hailing policy goals (Fig. 5), it is clear that each of the four cities has not only unique e-hailing policy goals and city policy goals in related policy areas, but also varying policymaking logics, based on which they generate distinctive e-hailing city *Measures* (that are in accordance with each city's policy goals).

The logic of the Xi'an *Measures* does not seem to be consistent with the city's policy goals, whereas the logic of Chengdu *Measures* is perfectly consistent with its city policy goals. Beijing and Guangzhou *Measures* fall between these cases, with some inconsistent and some consistent policies. If cities do not share the same policymaking logic, then it is hard to see this national-city policy mix as a process of policy experimentation, as there is no coherent logic that could be used to inform potential strategies for generalizing policies nationwide.

7. Conclusions

This study compares newly issued city e-hailing *Measures* in four Chinese cities—Xi'an, Chengdu, Beijing, and Guangzhou—and discusses their links with each city's distinctive policy goals. After assigning scores to the e-hailing policy goals (reflected in city *Measures*) and the city policy goals in the related policy areas of population policy (P), innovation policy (I), traffic policy (T), and environmental policy (E), and then comparing these sets of goals, we analyze whether each city's e-hailing policies are internally consistent with the city's goals in the related policy areas (P, I, T, E). We then analyzed how each of the four cities compares with the others

in terms of e-hailing-related policies in the P, I, T, and E policy areas.

It is clear that China's recent innovation policymaking regime departs from the conventional scholars' (cf. Xu 2011) conceptualization of a top-down, idealized innovation system characterized by logically coherent regional policy experiments in which regional governments serve as experimental laboratories, so that the central government can generalize the successful cases nationwide. Instead, regional policymaking is based on each region's unique situation, policy goals, and policymaking logic. Therefore, the regional (in this case, city) governments *per se* serve as the ultimate policymaking agencies, leaving barely any room for central-level generalization.

This finding has three specific implications. The first is the sharp contrast we report between the innovation practices shown here and the common conclusions drawn in previous studies. Unlike the mainstream arguments (either praising or criticizing China's seemingly uniform attitude to innovation; cf. Fu 2016; Fuller 2016, Yip and McKern 2016), we find that the governmental attitude toward innovation in China is complicated by a multivalent policymaking logic based on regionally specific needs.

Chengdu and Guangzhou generally welcome e-hailing, but Beijing and Xi'an impose harsh restrictions on the budding industry. Moreover, Xi'an *Measures* are significantly inconsistent with the city's policy goals, making the policymaking logic incongruent, whereas Beijing, Chengdu, and Guangzhou *Measures* are based on their own extreme (as in Beijing's status as the national capital), unique (such as Chengdu's large rural population), or moderate (such as Guangzhou's moderate situation in many respects) city contexts.

The second implication is related to the true, practical purpose of regional decentralization and policy experimentation. As mentioned in the literature review, many studies have overemphasized the top-down purpose of the experimental process (Heilmann 2008; Xu 2011; Heilmann and Melton 2013; Chen and Naughton 2016). These scholars presume that successfully implemented regional policies will be selected for generalization nationwide.

Each of our cases, however, demonstrates limited generalizability, let alone meeting other objectives discussed in previous studies such as overcoming political opposition. Therefore, the e-hailing cases we analyze point to the true, practical, and ultimate purpose of an innovation system characterized by policy experimentation: the 'experiment' is actually an experiment only insofar as it serves the region's (in this case, the city's) unique needs (which is to create and customize policy that suits the city's needs), not the needs of the central government. Only when and if this customization is permitted can regional governments, faced with distinct practical situations and concerns, effectively regulate, manage, implement, and spread an innovation (in this case, e-hailing). In other words, the purpose of such a policy experiment is not to generalize e-hailing to the entire country (indeed these policies demonstrate extremely limited generalizability). Rather, the purpose is to permit regional governments to find the right policy solutions for their particular contexts.

This feature has been further complicated by the introduction of new business models and new-economy services. As noted in the literature review, most studies that discuss the top-down and optimal goal of policy experiments draw on conventional examples, such as privatization and agricultural de-collectivization. Our cases show, however, that the present-day policymaking context has changed substantially—for both the Chinese central government and regional governments—because of the emerging new economy.

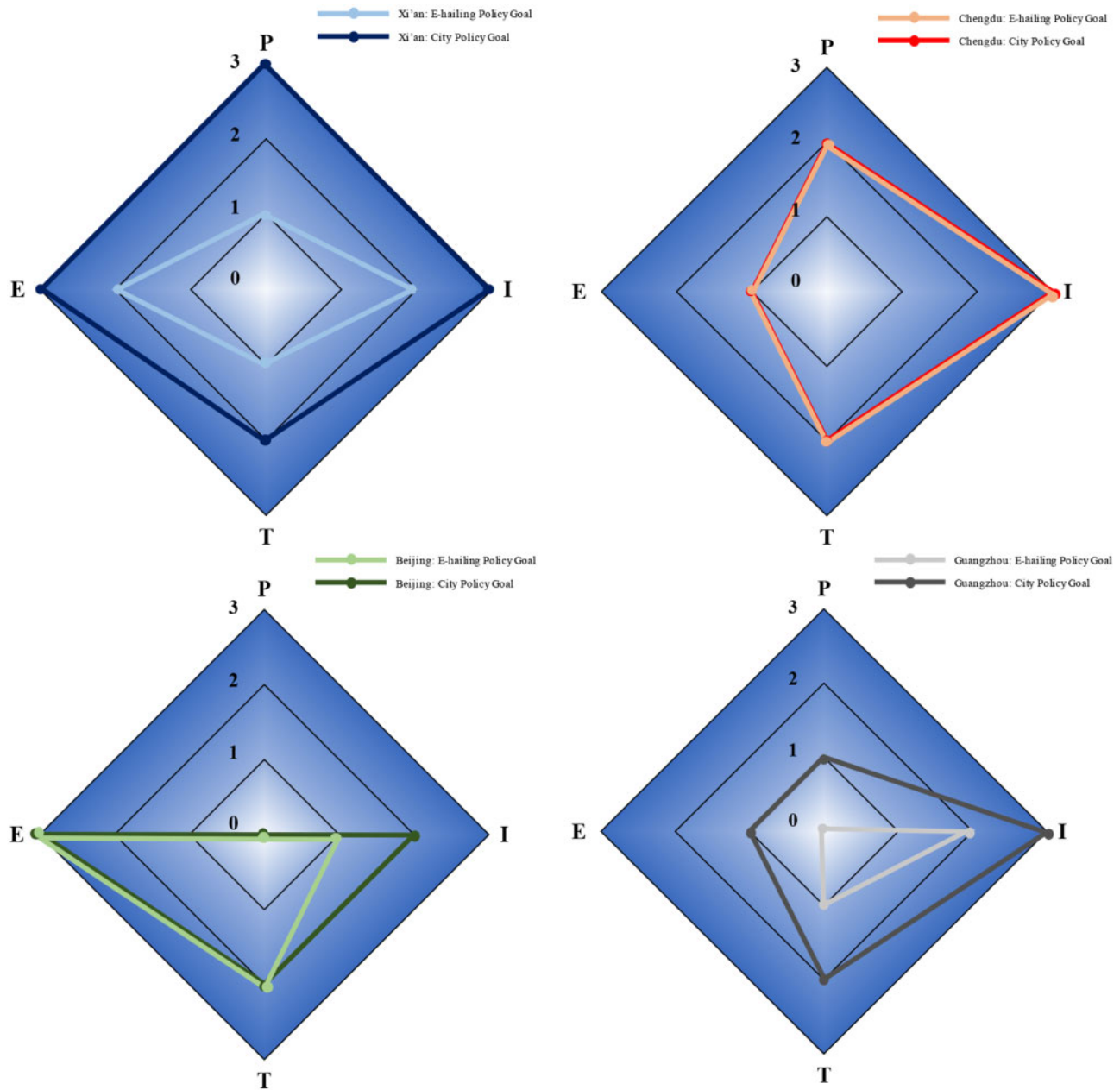


Figure 5. Four cities in terms of city and e-hailing policy goals.

There are three reasons for this change in policymaking context. First, the central government understands that China's decades-long economic reforms have entered a stabilizing stage, with subtler reforms undertaken by cities with varying situations and needs, unlike in the decades immediately following the original opening of the economy. Second, the uneven and diverging directions and speed of economic development in individual Chinese cities makes it difficult to generalize a single case to the whole country. Third, the emerging new economy, represented by the sharing economy (which includes e-hailing), could potentially generate serious tensions and ambiguities in governance, particularly regarding taxation, legislation, population control, and job creation (Schor 2016; Laurell and Sandström, 2017; Murillo et al., 2017). Faced with all of these widespread yet subtle issues that are entangled with diverging regional situations, it is no longer feasible for the central government to select

a successful regional case and hope to generalize it. Rather, the most viable way to promote technological and business innovations is to leave the innovation to regional (in this case, city) governments to sort out the appropriate policies for their contexts. With the continued introduction of new-economy innovations (in the context of, e.g. social media), we anticipate that this implication of our findings will be increasingly observed in future innovation policymaking in China.

The third implication of our study is theoretical. It resonates with the literature's insufficient attention to the exercise of agency on the part of regional, meso-level government actors (cf. Smith et al. 2005; Flanagan et al. 2011; Watkins et al. 2015; Flanagan and Uyarra 2016). Our case studies show that providing city governments with a central role in policymaking can be conceived of as a practical compromise between the center's wishing to dictate

policymaking and the unique needs of individual cities. If we are trying to thoroughly understand how national directives are transformed into city directives, then it is imperative that we pay greater attention to the creation of policy at the city level.

Finally, we mention several interesting directions for future research on the incentives and mechanisms city governments use when issuing specific innovation policies which may or may not align with the policies issued by the central government. Are there systematic structural differences between the socioeconomic situations in and development goals of Chinese cities regarding population, innovation, traffic control and environmental or other problems? Are there systematic problems caused by vested interests which significantly influence city policymaking responses to certain innovations? What kinds of policymaking tensions arise between the central government and city governments (cf. Motinola et al. 1995), and does the emergence of new-economy innovations exacerbate such tensions? Our study clears the way to exploring these questions.

Supplementary data

Supplementary data is available at *Science and Public Policy Journal* online.

Acknowledgements

The authors gratefully acknowledge funding support from the Research Grants Council of the Hong Kong Special Administrative Region, China (Project No. HKU C7011-16G).

Conflict of interest statement. None declared.

Notes

- At the beginning of each 5-year period, the central government issues a national *Five-Year Plan of Economic and Social Development*. Based on this document, cities develop their own 5-year plans as general planning documents. Cities also develop 5-year plans for specific aspects of development, such as innovation, transportation, etc. In this article, we use ‘city + number + Five-Year Plan’ to refer to the general 5-year plan documents issued by each city (i.e. Beijing *13th Five-Year Plan*). We use ‘city + number + Five-Year Plan on xxx’ to refer to each city’s specific 5-year plan document (e.g. Beijing *13th Five-Year Plan on Hi-Tech Industry Development*).
- For a general discussion of the trajectory of China’s innovation system, see Huang and Sharif (2016).
- Xu’s approach is echoed by various other scholars (cf. Cao et al., 1999; Motinola et al. 1995; Roland 2000). Heilmann (2008) and Heilmann and Melton (2013) argue that policy experiments are predicated upon a clearly defined central–regional hierarchy. The experimental policy process observes a cycle characterized by a central sponsorship → regional experiment → feedback to center → policy generalization pattern. Heilmann’s view is shared by innovation studies scholars such as Chaminade et al. (2009).
- While several studies examine the regional implementation of central policies in decentralized policy experiment systems (cf. Ackrill and Kay 2011; Ackrill et al. 2013; Chen and Ku 2014; Edler and James 2015), they fail to examine the practical purposes or consequences of policy experiments.
- Apart from government offices and government office administration, there are 39 typical functional areas comprising a city government in China, including: education, industry and information, public security, civil affairs, human resources and social security, the environment, urban and rural construction, housing administration, water administration, tourism, cultural affairs, auditing, state-owned assets, statistics, industry and commerce, production security, cultural relics, food, policy research, development and reforms, science and technology, ethnic affairs, the judiciary, fiscal policy, land resources, urban planning, public assets, transportation, agriculture and forestry, hygiene and birth planning, business, foreign affairs, sports, urban administration, quality supervision, food and drug security, investment and governmental cooperation, legal affairs, and defense.
- Note that these policy documents reflect a fairly wide range in terms of the scales of the policies with which they are concerned. Some documents are more general in nature and direction. These documents cover a longer time period, that is, they are *Five-Year Plans*. A second category of policy documents relates to implementation. These documents can be thought of as applying at the next scale below, as they explicate how documents in the first, broader category are to be executed (in particular policy areas). Finally, there are micro-level policy documents, such as regulations pertaining to a particular problem under a given policy area (i.e. the development of private electric cars under the environmental policy area), news alerts, and specific announcements related to much more narrowly defined problems. While some policies are clearly pitched at multiple scales, for the purposes of this article, we focus on summarizing the overall *direction(s)* indicated by the policies under each policy area. Therefore, the city policy goals to which we assign scores represent general directions rather than concrete targets to be reached or rigid rules that all city policymaking should follow.
- The exposure draft imposed serious limitations on the registration and operation of e-hailing businesses and was criticized by several scholars (see, e.g. Fu 2015a,b, 2016a,b; Tang 2015; Hou 2015; Information Society 50 Forum 2015; Liu 2016). Therefore, the final draft advocated adopting less stringent regulations.
- Many past policies regulating innovative sectors did not contain such city autonomy statements. One highly relevant example is the *Service Regulations on Third-party E-commerce Trading Platforms*, 2011, issued by the Ministry of Commerce. This example is relevant because the e-commerce industry is similar to the e-hailing industry in its national-level online base and its practical city-specific, off-line operational nature.
- ‘T’ stands for ‘turbo’ for cars using turbo-boosters, while ‘L’ stands for ‘liters’.
- See Xi’an Overall Urban Plan 2008–2020 (Revised), 2016.
- Xi’an 13th Five-Year Plan, 2016: 7.
- Xi’an 12th Five-Year Plan, 2011: Part II.
- Xi’an 13th Five-Year Plan, 2016: 35; Xi’an Suggestions on Further Attracting Talent and Loosening Partial Household Registration Admission Conditions, 2017.
- Xi’an 12th Five-Year Plan, 2011: Part III; Xi’an 12th Five-Year Plan on Hi-tech Industry Development, 2012: Part I.
- Xi’an 12th Five-Year Plan on Hi-tech Industry Development, 2012: Part II.
- Xi’an 13th Five-Year Plan, 2016: 22.
- New Business Registration Regulation of Xi’an Administration for Industry & Commerce, 2014
- Xi’an 13th Five-Year Plan, 2016: 23.

19. Xi'an 12th Five-Year Plan, 2011: Part II; Xi'an 13th Five-Year Plan, 2016: 39.
20. Xi'an Implementation Plan of New Urbanization Construction, 2015.
21. Xi'an 13th Five-Year Plan, 2016: 39.
22. Xi'an 13th Five-Year Plan, 2016: 39.
23. Xi'an Annual Arrangement on Traffic Congestion Releasing, 2014; Xi'an Implementation Measures on Taxi Operational Right Post-Expiration Readmission, 2015.
24. Xi'an 12th Five-Year Plan, 2011: Part VIII; Xi'an 13th Five-Year Plan, 2016: 47. Shaanxi Province Rule on Preventing and Combating Air Pollution, 2013.
25. Xi'an 12th Five-Year Plan, 2011: Part III; The 2016 Situation of Xi'an's Promotion and Application of New Energy Buses, 2017; Xi'an Public Exposure of Investment Subsidization of Charging Infrastructure Building for New Energy Cars, 2017.
26. A comparison can be made by juxtaposing the 2011 national Service Regulations on Third-party E-commerce Trading Platforms with the 2015 Xi'an Management Measures of E-commerce Trade. As e-commerce is still relatively immature and simple, and does not involve issues such as traffic, the logical inconsistency between national and Xi'an policies and between Xi'an's policies and its development goal are relatively minor.
27. Chengdu 12th Five-Year Plan, 2012: 3.
28. Chengdu 13th Five-Year Plan, 2016: 2.
29. Chengdu 12th Five-Year Plan on Population Development, 2012; Chengdu 13th Five-Year Plan, 2016: 35.
30. Chengdu 12th Five-Year Plan, 2012: 34.
31. Chengdu Suggestions on Supporting Entrepreneurship and Innovation for Small and Micro Businesses, 2015; Chengdu 13th Five-Year Plan on Science and Technology, 2017: 50.
32. Chengdu 12th Five-Year Plan on General Transportation, 2013: 7.
33. Chengdu 13th Five-Year Plan, 2016: 65.
34. Chengdu 12th Five-Year Plan on General Transportation, 2013: 19.
35. Chengdu 12th Five-Year Plan on Environmental Protection, 2012; Chengdu Rules on Preventing and Combating Air Pollution, 2015.
36. Chengdu 12th Five-Year Plan on Hi-Tech Industry Development, 2012; Chengdu 12th Five-Year Plan on Science and Technology, 2012; Chengdu Suggestions on Keeping Stable Economic Development, 2014.
37. Chengdu 13th Five-Year Plan on Science and Technology, 2017: 23; Chengdu 13th Five-Year Plan on Environmental Protection, 2017.
38. Beijing 13th Five-Year Plan, 2016.
39. Beijing Implementation Suggestions on Promoting the Reform of Household Registration System, 2016.
40. Beijing 12th Five-Year Plan, 2011; Beijing General Plan of Enhancing the Construction of S&T Innovation Center, 2016.
41. Beijing Implementation Suggestions on Actively Implementing the Action of 'Internet+', 2016.
42. Beijing 12th Five-Year Plan on Transportation Development and Construction, 2012: 6.
43. Beijing 13th Five-Year Plan on Transportation Development and Construction, 2016: 15.
44. Beijing 13th Five-Year Plan on Transportation Development and Construction, 2016: 44.
45. Beijing 12th Five-Year Plan on Transportation Development and Construction, 2012: 22.
46. Code for Transport Planning on Urban Road, 1995.
47. Beijing 12th Five-Year Plan on Transportation Development and Construction, 2012: 7.
48. Beijing Clean Air Action Plan 2013–2017, 2013; Beijing Rules on Preventing and Combating Air Pollution, 2014.
49. Beijing 13th Five-Year Plan on Transportation Development and Construction, 2016: 35; Beijing Temporary Traffic Measures in Dealing with Serious Air Pollution, 2016.
50. Beijing 12th Five-Year Plan on Hi-tech Industry Development, 2011; Beijing 12th Five-Year Plan on Building Green Beijing, 2015.
51. 1000 Charge Bases Are Put into Use in Beijing, 2015; Beijing Measures on Promoting and Managing Commercial New-energy Cars, 2017.
52. Guangzhou 13th Five-Year Plan on Population Development and Fundamental Public Service System Construction, 2017: 4.
53. Guangzhou Suggestions on Enhancing Population Control, Service and Management, 2014.
54. Guangzhou Suggestions on Enhancing Population Control, Service and Management, 2014; Guangzhou 13th Five-Year Plan on Population Development and Fundamental Public Service System Construction, 2017: 4.
55. Guangzhou 12th Five-Year Plan, 2013: Part III.
56. Guangzhou 13th Five-Year Plan on Science, Technology and Innovation, 2017: 30.
57. Guangzhou Development Plan on Strategic New Industry, 2012.
58. Guangzhou Internet+ Action Plan, 2015; Guangzhou 13th Five-Year Plan on Informationization, 2017; Guangzhou 13th Five-Year Plan on Science, Technology and Innovation, 2017: 30.
59. Guangdong 12th Five-Year Plan on Science and Technology Development, 2013; Suggestions on Further Loosening the Condition of Guangzhou Commercial Entity Locations and Operation Sites, 2016; Several Suggestions on Further Relieving Enterprise Burdens and Enhancing the Health Development of Medium, Small and Micro Enterprises, 2014.
60. Guangzhou Suggestions on Practicing Public Transportation Priority and Promote the Construction of Public Transportation City, 2014.
61. Guangzhou 13th Five-Year Plan on General Transportation Development, 2016.
62. Internet+ Action Plan in Guangdong Province, 2015; Action Plan on Construction of Intelligent Guangzhou, 2016.
63. Guangzhou Implementation Suggestions on Deepening Reform and Enhancing Healthy Development of Taxi Industry, 2016; Guangzhou Traffic Offices Take Various Measures to Enhance Taxi Service Quality, 2017.
64. Guangzhou 12th Five-Year Plan, 2013: Part III; Guangzhou 12th Five-Year Plan on Environmental Protection, 2013: Part IV; Guangzhou 12th Five-Year Plan on Energy-Saving, 2013.
65. Guangzhou 12th Five-Year Plan on Environmental Protection, 2013: Part IV.
66. Guangdong Province Plan on New-energy Car Industry (2013–2010), 2013; Guangzhou Temporary Measures on Improving Electronic Car Charging Facilities and Management, 2015.
67. The 'strategic position' is drawn from Xiao's classification system (2016), which is based on an analysis of business resource concentration, pivotal city position, citizen liveliness,

life diversity, and future potential. Tier-1 cities are among the highest-scoring in all of these indicators, whereas New Tier-1 cities are major emerging cities.

68. 'Registered population' refers to individuals who have *hukou* documents registered under a city's administration. This entitles such individuals to receive the welfare benefits offered by the city government.
69. 'Permanent population' refers to all residents in a city with or without *hukou* documents.
70. 'City district population' refers to the number of people living in a city—it does not include the number of people living in the counties affiliated with the city. This figure can serve as a guide to the size of the urban population relative to the cities' total population (which includes the population of city-affiliated counties).

References

- 21st Century Economic Report. (2016) Jianzhi chezhu cheli wangyueche pingtai, gongxiang jingji ruhe baituo butie mzhou? (Part-time drivers withdraw from e-hailing platforms, how can sharing economy get rid of the curse of subsidization?) <http://epaper.21jingji.com/wap/html/2016-08/09/content_44745.htm> accessed 5 Dec 2018.
- Ackrill, R. and Kay, A. (2011) 'Multiple Streams in EU Policy-Making: The Case of the 2005 Sugar Reform', *Journal of European Public Policy*, 18/1: 72–89.
- , ———, and Zahariadis, N. (2013) 'Ambiguity, Multiple Streams, and EU Policy', *Journal of European Public Policy*, 20/6: 871–87.
- Amap. (2017) 2017 Shangban niandu zhongguo zhuyao hengshi gonggong jiaotong dashuju fenxi baogao (The big data analysis report of public transportation in major Chinese cities, the 1st half of 2017) <<http://www.199it.com/archives/644861.html>> accessed 5 Dec 2018.
- Amey, A., Attanucci, J., and Mishalani, R. (2011) 'Real-Time Ridesharing: Opportunities and Challenges in Using Mobile Phone Technology to Improve Rideshare Services', *Transportation Research Record: Journal of the Transportation Research Board*, 2217: 103–10.
- Beijing Statistics Bureau. (2017, July 26). *Renkou (Population)*. <http://www.bjstats.gov.cn/tjsj/cysj/201511/t20151109_311727.html> accessed 18 Apr 2018.
- Cao, Y., Qian, Y., and Weingast, B. R. (1999) 'From federalism, Chinese Style to Privatization, Chinese Style', *Economics of Transition*, 7/1: 103–31.
- Chaminade, C. B. A., Lundvall, J. V. and Joseph, K. J. (2009) 'Designing innovation policies for development: towards a systemic experimentation-based approach', *Handbook on Innovation Systems and Developing Countries: Building Domestic Capabilities in a Global Setting*.
- Chen, L. and Naughton, B. (2016) 'An Institutionalized Policy-Making Mechanism: China's Return to Techno-Industrial Policy', *Research Policy*, 45/10: 2138–52.
- and Ku, Y.-H. (2014) 'Indigenous Innovation vs. Teng-Long Huan-Niao: Policy Conflicts in the Development of China's Flat Panel Industry', *Industrial and Corporate Change*, 23/6: 1445–67.
- Cui, H., Jin, L., Zhou, H., et al. (2018) *Zhongguo Chengshi xin nengyuan chengyong che jili zhengce pinggu (Evaluation Report of New-Energy Vehicle Encouragement Policies in Chinese Cities)*. Beijing: International Council on Clean Transportation. <https://www.theicct.org/sites/default/files/publications/China-urban-NEVs_ICCT-White-Paper_12042018_vF.pdf> accessed 5 Dec 2018.
- Elder, J. and James, A. D. (2015) 'Understanding the Emergence of New Science and Technology Policies: Policy Entrepreneurship, Agenda Setting and the Development of the European Framework Programme', *Research Policy*, 44/6: 1252–65.
- Flanagan, K. and Uyarra, E. (2016) 'Four Dangers in Innovation Policy Studies—and How to Avoid Them', *Industry and Innovation*, 23/2: 177–88.
- , ———, and Laranja, M. (2011) 'Reconceptualising the "Policy Mix" for Innovation', *Research Policy*, 40/5: 702–13.
- Fu, W. (2015a) 'Hulianwang+ yu zhengfu guizhi celve xuanze. (Internet+ and Governance Strategy Choice)', *China Law Review*, 2: 50–4.
- Fu, X. (2015b) *China's Path to Innovation*. Cambridge: Cambridge University Press.
- Fu, W. (2016a) 'Zhuanche lifa zai cujin chuangxin ma? (Is E-Hailing Legislation Promoting Innovation?)', *Law and Economy*, 2: 68–74.
- (2016b) *Xi'an wangyueche xingui chutai yin guanzhu, wangyueche shidai huo jiang guoqu. (Xi'an e-hailing new regulation attracts attention, the time of e-hailing may pass by)* <<http://xian.qq.com/a/20161102/004397.htm>> accessed 7 Aug 2017.
- Fuller, D. B. (2016) *Paper Tigers, Hidden Dragons: Firms and the Political Economy of China's Technological Development*, 1st edn. Oxford: Oxford University Press.
- Heilmann, S. (2008) 'Policy Experimentation in China's Economic Rise', *Studies in Comparative International Development*, 43/1: 1–26.
- and Melton, O. (2013) 'The Reinvention of Development Planning in China, 1993–2012', *Modern China*, 39/6: 580–628.
- Hou, D. (2015) 'Wangyueche guizhi lujing bijiao yanjiu—Jianping Jiaotongyunshubu Wangluo Yuyue Chuzuche Jingying Fuwu Guanli Zanzing Banfa (Zhengqiu Yijian Gao) (A comparative study of e-hailing regulation trajectories—With a comment on Ministry of Transportation's Temporary Measures on the Operation and Service of E-hailing (Exposure Draft))', *Journal of Beijing University of Technology (Social Science)*, 6: 96–103.
- Huang, C. and Sharif, N. (2016) 'Global Technology Leadership: The Case of China', *Science and Public Policy*, 43/1: 62–73.
- and Liang, J. (2017) 'Erxian chengshi qiangren dazhan zhong que shenme? (What are Tier-2 cities lacking during the battle over talents?)', 21st Century Economic Report <http://epaper.21jingji.com/html/2017-09/13/content_70470.htm> accessed 5 Dec 2018.
- Huashang News. (2016, Nov 1) Xi'an wangyueche xingui zhengqiu yijian: dui chexing yaoqiu yanke (Xi'an e-hailing new regulation for exposure: strict on technical requirement on cars) <<http://tech.sina.com.cn/i/2016-11-01/doc-ixfxysn8340295.shtml>> accessed 7 Aug 2017.
- Ifeng News. (2015, May 31) Xi'an chuzu dizhi wangyueche naoshi, chuzuche jiti shangjie "yuzhong" manbu. (Xi'an taxis go for protesting against e-hailing, taxis collectively go onto street in rain). <<http://i.ifeng.com/news/share/news.f?aid=109770915>> accessed 21 Nov 2016.
- Information Society 50 Forum. (2015) 'Cong "wangyueche xinzheng" toudi zhuanxingqi zhengfu zhili linian zhuanbian zhi biyaoxing—'zhuanche xinzheng yu gongxiangjingxi fazhan' yantaohui jishi. (Projecting the necessity of governmentality ideology change of the government in the transformative period through the new e-hailing policy—A record of the seminar on 'New zhuanche policy and development of sharing economy')', *E-Government*, 11: 32–42.
- Jia, G. (2016, Aug, 9) 31 shenghui chengshi chuzuche xianzhuang: 21 cheng wanren yongyouliang budabiao, Shijiazhuang zuidi. (Current situations of the taxi market of the 31 provincial capitals: 21 with unsatisfactory possession per 10,000 person, with Shijiazhuang the lowest). *China Economy Weekly*. 31.
- Laurell, C., and Sandström, C. (2017) 'The Sharing Economy in Social Media: Analyzing Tensions between Market and Non-market Logics', *Technological Forecasting and Social Change*, 125: 58–65.
- Leng, H. (2018) *Jujiao chengshi qiangren dazhan: chule hukou, haiyou zhexie fuli. (Focusing on the battle over talents in various cities there are these benefits beyond hukou)*. <http://www.xinhuanet.com/city/2018-04/13/c_129849630.htm> accessed 5 Dec 2018.
- Liu, F., Simon, D. F., Sun, Y., et al. (2011) 'China's Innovation Policies: Evolution, Institutional Structure, and Trajectory', *Research Policy*, 40/7: 917–31.
- , ———, ———, et al. (2016) 'Wangluo yuyue chuzu qiche jingying fuwu guanli zanzing banfa (zhengqiu yijian gao) zhi shizhi hefaxing fansi (A review on the substantial legality of Temporary E-Hailing Service Management Measures)', *Graduate Law Review*, 1: 37–45.

- Ministry of Ecology and Environment. (2018) *Guanyu Daqi Wuran Fangzhi Xingdong Jihua shishi qingkuang zhongqi kaobe jieguo de tongbao* (Announcement on the final assessment result of Action Plan of Air Pollution Prevention and Combatant). <http://www.mee.gov.cn/gkml/sthjbgw/stbgh/201806/t20180601_442262_wap.shtml> accessed 5 Dec 2018.
- Motinola, G., Qian, Y., and Weigast, B. R. (1995) 'Federalism, Chinese style: The Political Basis for Economic Success in China', *World Politics*, 48: 50–81.
- Murillo, D., Buckland, H., and Val, E. (2017) 'When the Sharing Economy becomes Neoliberalism on Steroids: Unravelling the Controversies', *Technological Forecasting and Social Change*, 125: 66–76.
- Qdaily. (2016, Nov 1) *Wangyueche jintian bei guan qilai le, zhe hui yingxiang shenme? Women huizong le 58 ge chengshi de xinxi* (E-hailing gets regulated today, what will this influence? We summarized the information on 58 cities) <<http://www.qdaily.com/cooperation/articles/yidian/33957.html>> accessed 24 Apr 2018.
- Schor, J. (2016) 'Debating the Sharing Economy', *Journal of Self-Governance & Management Economics*, 4/3: 7–22.
- Smith, A., Stirling, A., and Berkhout, F. (2005) 'The Governance of Sustainable Socio-Technical Transitions', *Research Policy*, 34/10: 1491–510.
- State Council. (2018) *Guanyu yinfa Daying Lantian Baoweizhan Sannian Xingdong Jihua de tongzhi* (Announcement on the issuance of 3-Year Action Plan of Protecting the Blue Sky) <http://www.gov.cn/zhengce/content/2018-07/03/content_5303158.htm> accessed 5 Dec 2018.
- Tang, Q. (2015) 'Zhuancheng lei gongxiang jingji de guizhi lujing (The governance trajectory on e-hailing type sharing economy)', *China Legal Science*, 4: 286–302.
- Tian, Y. (2018) *Erxian chengshi kaiqi qiangren dazhan, song hukou song fangzi hai song qian*. (Tier-2 cities has started the battle over talents, offering hukou, offering housing, and even offering money) <http://www.sohu.com/a/221964969_114960> accessed 5 Dec 2018.
- Tao, S. (2016, Nov 6) *Ping Xi'an wangyueche xinzheng: defang buying tuo gongxiang jingji houtui*. (Review on Xi'an's e-hailing Measures: Local governments should not hinder sharing economy) <<http://tech.sina.com.cn/i/2016-11-06/doc-ifxnety7477847.shtml>> accessed 7 Aug 2017.
- TusResearch Institute. (2017) *Urban Innovation and Entrepreneurship Evaluation Research Report*. Beijing: TusResearch Institute. <<http://www.tusholdings.com/stations/522432690a/s/upload/2017/11/22/5a14df590dd.pdf>> accessed 5 Dec 2018.
- Wang, H. (2018) *Erxian chengshi qiangren dazhan ruhuorutu, yixian chengshi ye annai buzhu le*. (The battle over talents between Tier-2 cities are becoming fierce, and Tier-1 cities are ready to participate in). *China Economic Weekly* <<https://news.caijingmobile.com/article/detail/357968>> accessed 5 Dec 2018.
- Watkins, A., Papaioannou, T., Mugwagwa, J., et al. (2015) 'National Innovation Systems and the Intermediary Role of Industry Associations in Building Institutional Capacities for Innovation in Developing Countries: A Critical Review of the Literature', *Research Policy*, 44/8: 1407–18.
- Xiao, W. (2016, Apr 26) *2016 zhongguo chengshi shangye meili paihangbang zhongbang fabu: Zhongguo chengshi zai fenji* (2016 China cities commercial attractiveness released: A re-ranking of Chinese cities) <<http://www.cbnweek.com/articles/normal/14189>> accessed 31 May 2017.
- Xu, C. (2011) 'The Fundamental Institutions of China's Reforms and Development', *Journal of Economic Literature*, 49/4: 1076–151.
- Yip, G. S. and McKern, B. (2016) *China's Next Strategic Advantage: From Imitation to Innovation*. Cambridge: The MIT Press.
- Zhang, M. Y. (2016) 'Meso-Level Factors in Technological Transitions: The Development of TD-SCDMA in China', *Research Policy*, 45/2: 546–59.