

# **The collaborative governance of the urban sharing economy: A comparative analysis of dockless bike- sharing schemes in Nanjing and Sydney**

**by Jun Cao**

Thesis submitted in fulfilment of the requirements for  
the degree of

**Doctor of Philosophy**

under the supervision of Professor Jason Prior and  
Professor Damien Giurco

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## **Certificate of Original Authorship**

I, Jun Cao, declare that this thesis is submitted in fulfilment of the requirements for the award of PhD degree, in the Institute for Sustainable Futures at the University of Technology.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This document has not been submitted for qualifications at any other academic institution.

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## Thesis by compilation

In line with the guidelines of the Institute for Sustainable Futures at UTS, this dissertation takes the structure of a thesis by compilation, combining a series of published peer-reviewed journal papers (**Chapters 2, 4, 5, 6**) with an exegesis comprising an introduction (**Chapter 1**), methodology (**Chapter 3**) and conclusion (**Chapter 7**). The thesis includes the following papers:

1. **Cao, J.** Prior, J., Moutou, C. (2021). The governance of dockless bike-sharing schemes: A systemic review of peer-reviewed academic journal papers between 2016 and 2019. *Cleaner Engineering and Technology*, 4, 100-140.
2. **Cao, J.** (currently under revision). A systematic review of the empirical research methodologies used to study the governance of dockless bike-sharing schemes (2017 to 2021). *Sustainability*.
3. **Cao, J.**, Prior, J., Gu, D., Giurco, D. (2022). How do government and industry engage in the collaborative governance of dockless bike-sharing schemes in Nanjing, China? *Urban Policy and Research*, 3, 111-146.
4. **Cao, J.**, Prior, J., Giurco, D. (2022). Government and private company collaboration in the governance of shared mobility schemes: A case study of dockless bike-sharing schemes in Sydney, Australia. *Sustainability*, 14 (20), 13141.
5. **Cao, J.**, Prior, J., Giurco, D., Gu, D. (2023). Power relations are central to shaping collaborative governance of the urban sharing economy. *Humanities and Social Sciences Communications*, 10 (1), 85.

## Declarations of co-authorship

The following tables detail the contribution of each co-author to the papers published or submitted to a journal as part of this thesis. Each party has agreed on the extent of the stated contribution.

### Paper 1.

In the case of Paper 1 [*The governance of dockless bike-sharing schemes: A systemic review of peer-reviewed academic journal papers between 2016 and 2019*], the below parties agree that the nature and extent of the contributions to the work were as follows:

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### Paper 2.

Paper 2 [*A systematic review of the empirical research methodologies used to study the governance of dockless bike-sharing schemes (2017 to 2021)*] was solo-authored by Jun Cao.

**Paper 3.**

In the case of Paper 3 [*How do government and industry engage in the collaborative governance of dockless bike-sharing schemes in Nanjing, China?*], the below parties agree that the nature and extent of the contributions to the work were as follows:

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## **Acronyms**

**CG:** Collaborative governance

**CNKI:** China National Knowledge Infrastructure

**CO<sub>2</sub>:** Carbon dioxide

**BSS:** Bike-sharing scheme

**DBSS:** Dockless bike-sharing scheme

**GPS:** Global Positioning System

**ICT:** Information and Communications Technology

**NTB:** Nanjing Transportation Bureau

**NTPB:** Nanjing Traffic Police Bureau

**NUAB:** Nanjing Urban Administration Bureau

**NSW:** New South Wales

**RTPS:** Research Training Program Scholarships

**UN:** United Nations

**US:** United States

**UTS:** University of Technology Sydney

**WoS:** Web of Science

## **Abstract**

The sharing economy has been booming in global cities since the early 2000s. Dockless bike-sharing schemes (DBSS) are a significant innovation within the urban sharing economy. They not only solve the ‘last mile’ problem for residents, but also encourage cities to embrace an ethos of ‘shared’ (rather than privately owned) resources. As a means of sustainable and ‘green’ transportation, DBSS thus have many potential benefits, reducing waste, pollution and consumption. However, the introduction of DBSS in busy urban centres has also created significant challenges to existing modes of urban governance.

This thesis presents two case studies of collaborative governance (CG) regimes that were established to govern DBSS in Sydney, Australia and Nanjing, China between 2017 and 2021. This empirical research focuses on understanding the various forms of collaboration between key actors (government officials and private DBSS enterprises) in the CG of DBSS, and compares these findings to inform the CG of other kinds of urban sharing services in cities around the world. Theoretically, this thesis applies and tests certain principles from Emerson et al. (2012)’s Integrative Framework for Collaborative Governance.

This research relies mostly on qualitative data collection methods (including semi-structured interviews, focus group discussions, and document analysis) to address an identified gap in the existing DBSS literature: how government and enterprise actors



collaborate in governing DBSS in global cities. This research also aims to be among the first to use a theoretical CG framework to bolster its study of DBSS in practice.

This thesis offers several empirical and theoretical insights, and identifies two different types of CG of DBSS: Nanjing's authoritarian CG, and Sydney's self-organising CG. Nanjing's authoritarian form of CG – where local governments play a dominant role – has certain advantages, namely the ability to rapidly mobilise access to administrative and financial resources. Yet Nanjing's authoritarian form of CG also tends to stifle incentives for innovation by DBSS industry actors. By contrast, the Sydney case study shows that any successful CG collaboration depends, in part, on establishing regular communication channels, knowledge-sharing, and trust-building between actors. However, this self-organising form of CG does not always lead to agreement, and its success depends on higher-level government authorities playing a more active leadership role. A significant finding of this thesis is that power relations between government and enterprise actors are foundational in defining and shaping how actors engage with one another in CG practice. These empirical findings will be useful to CG and DBSS researchers, policymakers, urban planners, and communities who seek to understand the range of CG practices possible in the era of the sharing city.

# Chapter 1: Introduction

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This introduction describes my motivations in undertaking this research project, and provides some background information and context for my choice of topic. I define my research aims and objectives; delineate the scope of my thesis; and identify the significance of my findings and the contribution my research makes to the broader field. In this chapter, I also lay out the overall structure of my thesis.

## 1.1 Research drivers and motivation

Sharing is essential to creating social capital, and is among the oldest values and means of exchange in human society (Belk, 2010). In recent years, information and communications technology (ICT) and commercial capital have enabled the development of the concept of sharing into a new economic form, called the sharing economy, which is an umbrella concept for a wider range of disparate consumption practices and organisational models (Curtis and Mont, 2020).

The contemporary surge in innovations and entrepreneurship collectively dubbed “the sharing economy” has made a broad range of urban services increasingly shareable (Hamari et al., 2016). Online applications and platforms such as Airbnb, Uber and Mobike have enabled urban residents to rent spare rooms in their houses, take a taxi

ride in other people's private cars, and use urban bike-sharing services whenever needed.

Many global cities are embracing the idea of a “sharing city” now and into the future, believing these innovations open up new possibilities and pathways towards more sustainable urban living (Agyeman and McLaren, 2017). A city built on the value of sharing instead of owning can potentially boost resource-use efficiency and make ‘green’ transportation – especially cycling – attractive to its residents.

However, the complex reality of the sharing economy in practice means that it can also create many challenges to urban governance. The rise of dockless bike-sharing schemes (DBSS) in cities around the world from 2016 onwards – while good for social and environmental sustainability – has caused unanticipated problems, such as bikes being left carelessly parked on pedestrian paths, or blocking train station entrances or other amenities, causing disorder in urban public space (Jiang et al., 2019).

Over time, a more effective and sophisticated solution has been formulated through a collaborative governance (CG) approach that involves a cross-boundary collaboration between local governments and the private DBSS enterprises running bike-sharing schemes (BSS) in global cities. The successful use of CG in various urban contexts to support and sustainably govern these DBSS reveals that – at the core of any “sharing

city” – there should be collaborative, public-private processes and partnerships that encourage local governments and entrepreneurs to work together to achieve mutually beneficial outcomes (Cao et al., 2023).

As a researcher, I have been strongly drawn to understanding the details of CG of DBSS in various cities (in both China and Australia), studying how these CG regimes depend on communicative and collaborative processes to meet the needs and interests of different groups in a given society. This is not to say that CG always works smoothly or effectively, nor that all types of CG in different urban and cultural contexts are the same. What interests me – and has become the topic of my doctoral research project – is how CG works *in practice* in particular settings: the power-sharing (or power struggles); the inevitable frictions between local governments and private DBSS enterprises; and how these conflicts are mediated and overcome.

The insights from my research (informed by in-depth case studies of CG in practice) will, I hope, provide invaluable insights into how a functioning and effective CG framework can be established – and sustained – for any sharing economy models.

My focus in this research is on the CG of DBSS. These schemes fill a significant gap in the sharing economy by concentrating on providing short-distance transport services for residents who might not have access to other forms of public transport. DBSS also

help to solve the ‘last mile’ issue for residents (enabling them to get fully door-to-door using public transport).

Since the initial launch of DBSS in China in 2016, these schemes have fundamentally changed urban travel behaviours, urban living and urban socio-economic relationships (Ma et al., 2018) in cities in China and around the world. Since DBSS operate at the interface of local government and for-profit enterprises – and can sometimes result in a clash of interests between governments and entrepreneurs – their governance has, to date, been challenging for stakeholders, but also deeply interesting to anybody studying CG in urban settings.

In my research project looking at the CG of DBSS in theory and practice, I have asked some fundamental questions (concerning the collaboration process among multiple public and private actors) that had previously been unanswered, such as:

- How does urban context affect the engagement of government actors and DBSS enterprises in a CG arrangement?
- How do government actors and enterprise representatives dynamically interact within the CG frameworks guiding and governing DBSS?
- What collaborative outcomes and adaptations arise from the engagement and interactions between government actors and enterprises in the CG of DBSS?

- What are the implications of this research (especially in terms of applying and testing existing theoretical frameworks linked to CG) within the wider DBSS research field?

## **1.2 Research context**

Section 1.2 provides definitions and context for key concepts in this thesis, including the sharing economy, sharing cities, sustainable cities, DBSS, and CG.

### **1.2.1 The emergence of the sharing economy**

The sharing economy is a term often used to describe a new economic model based on a share-to-use system enabled by the internet, mobile phone networks, GPS, and other information and communications technologies (Belk, 2010).

In the sharing economy, owners can rent out something they are not using (such as a bike) through online platforms created and maintained by technology start-ups. Sharing platform enterprises act as matchmakers, allocating resources, facilitating communications and managing online transactions. While the concept of renting out unused resources is nothing new, the internet makes it much cheaper and easier than ever to aggregate supply and demand.

Many scholars argue that ‘the sharing economy’ is a sometimes too-broad umbrella term, and that – in practice – it takes a variety of forms (Eckhardt and Bardhi, 2015). For instance, the sharing economy is not limited to peer-to-peer services. It can also apply to one single owner who grants citizens access to corporate properties, like the urban DBSS services offered by companies like Lime, Mobike and Hellobike. Yet a shared, common value of the sharing economy is that information about – and access to – certain goods or services is available to a much larger pool of citizens. For this reason, the sharing economy is also sometimes framed as an “access economy,” promoting collaborative consumption (in which participants share access to products or services) over individual ownership (Eckhardt and Bardhi, 2015).

### **1.2.2 Sharing city initiatives**

Since cities first came into existence, they have always been about making ‘space’ for sharing, interaction and exchange between residents. A sharing city is not only a city that accepts and celebrates the cultural ethos of sharing, but is also a city of *practical* shareability made possible by technology, entrepreneurship, public engagement, and supportive institutional settings.

A broad range of urban services can be reimaged and reconfigured in a sharing city, such as urban public space, urban infrastructure, sanitation, and shared mobilities. Historically, the government has provided these urban utilities for all residents within

a particular city's jurisdiction. Sharing city innovations have significant potential to contribute to these existing urban commons by enabling the collective provision of urban services that might not otherwise be possible. One important and widespread example of this is the urban DBSS services that have cropped up in cities around the world.

### **1.2.3 The sharing city and urban sustainability**

There is little doubt that the sharing city can have many environmental benefits, and thus contribute to more sustainable urban living (Shi et al., 2018). With its sudden emergence from around 2008 to 2010, the sharing economy was seen as an antidote to materialism and overconsumption in the aftermath of the global financial crisis. Inspired by the popular mantra that 'access trumps ownership,' a viable sharing economy needs less energy and fewer materials, meaning resources can be used more efficiently. Research in cities in Europe and the U.S. has shown that urban bike-sharing services reduce carbon dioxide emissions, congestion and fuel wastage (SFOE, 2006; NLC, 2011).

The sharing city also opens a pathway towards urban sustainability without sacrificing city residents' quality of life. Sharing often allows people to gain access to new services and experiences that they wouldn't otherwise be able to afford. In contemporary times, young people often see ownership as a burden rather than as a privilege (Zhu and She,



2017). For many urban residents, the pressures and uncertainties of modern city life make embracing a lifestyle with fewer possessions a necessity, not a choice (Belk, 2010). For this confluence of reasons, urban societies globally are moving towards being organised around access to assets, instead of ownership (Botsman and Rogers, 2010).

#### **1.2.4 The development – and past challenges – of bike-sharing schemes**

It is widely accepted that there have been four generations of bike-sharing schemes (BSS) up to the present time (Fishman, 2016). The first generation was Amsterdam's 'White Bike' scheme, launched in 1965. Shared bikes, painted white, were provided for public use. Things did not go as planned, as these shared bikes were thrown into the canals or appropriated for private use. The BSS program collapsed within a short time period (DeMaio, 2009). Copenhagen's coin-deposit BSS, called Bycyklen and launched in 1995, is considered the second generation. Both of these iterations of BSS lacked security devices (Gu et al., 2019). Ten years later, the third generation of BSS emerged in France in 2005, with about 7,000 bikes (which has since expanded to 23,600 bikes in the city and suburbs). This generation of BSS used GPS-tracking technology to mitigate the issue of bike theft (Parkes et al., 2013).

Solving the problem of how to have a large number of shared bikes spread equally across different pick-up and drop-off points motivated the next wave of BSS

innovation. Dockless bike-sharing schemes (DBSS) first arose in Chinese cities in 2016, and are now a common feature of cities worldwide. They are generally considered to be the fourth-generation version of BSS programs (Ma et al., 2018; Gu et al., 2019).

DBSS also aim to give citizens a reliable and sustainable way to use bikes not only for longer commutes, but for short distances too, thus addressing the problem of ‘the last mile’ (Badiane et al., 2020). These fourth-generation DBSS systems are characterised by user flexibility (enabled by widespread public use of GPS and smartphones), easier installation, and power assistance when needed (Shaheen et al., 2010; Parkes et al., 2013; Fishman, 2019). Users unlock and pay for the use of these shared bikes through a smartphone app, and they can pick up and return a bike anywhere at their convenience, which is why these bike-share schemes are referred to as “dockless” (Jia et al., 2018).

It is estimated (with the caveat that different metrics and measurements produce slightly different final totals) that since the launch of the first generation versions of BSS, there have been more than 375 BSS programs (a figure that includes more recent DBSS programs) across 33 countries in almost every region of the world (Han, 2020), with global urban users sharing around 236,000 bikes.

These technology-enabled DBSS platforms run by private enterprises are now being used by more and more people in urban centres. While DBSS can bring many benefits to a city, they also create new tensions between private interests (the enterprises who own the bikes and oversee the programs) and the public realm, as noted in Section 1.1. These conflicts of interest often play out in urban public spaces. As widely reported on social media, shared bikes parked casually (or illegally dumped) on the streets can create hazards and obstacles for pedestrians and passengers, and degrade the quality of public space (Jiang et al., 2019; Zhao and Wang, 2019). Initially, local governments, urban policymakers, and regulators were slow to find viable solutions to the challenges posed by DBSS (Garud et al., 2022). Over time, however, a more sustainable governance approach that encourages collaboration between multiple actors (both public and private) has become common as a means of successfully governing urban DBSS services.

### **1.2.5 Collaborative governance**

A flourishing sharing city needs good governance and collective civic decision-making mechanisms to maintain a shared, orderly public realm while also encouraging private entrepreneurship to meet public needs and more widely distribute resources and opportunities (Agyeman and McLaren, 2017). Pieterse (2000) argues that good governance is, in essence, about effective collaborative planning, robust decision-making processes (and mechanisms), and skilled implementation.

Good governance allows for the coordination of efforts by local governments, civil society organisations, and the private sector in promoting sustainable urban development and participatory democracy. Within the field of urban governance and theory, this kind of approach has come to be called ‘collaborative governance’ (CG). Currently, CG has become an important concept for understanding various modern urban governance principles. This is due to the consensus-based, problem-solving approach emphasised by CG theory, making it suitable to understanding contemporary issues in a society where people (or public and private organisations) seek to control their own lives, or maintain their interests through negotiation with others (Kim, 2010). CG is an umbrella concept that emphasises cross-sectoral and multi-institutional arrangements between the public and private sectors to address complex governance problems or to advance common goals (Ansell and Gash, 2008). The theoretical tenets of CG have been widely applied in both theoretical and empirical research in domains as varied as environmental management, climate and sustainability governance, and conflict resolution (Ma et al., 2018).

The theory of CG stresses the need to integrate multi-dimensional governance frameworks to enable multiple actors to collaborate in tackling difficult issues that require new kinds of problem-solving and innovation. It makes perfect sense that many cities have established versions of CG to help resolve some of the thornier issues raised by the sharing economy. Local governments and private DBSS enterprises, for instance,

are both equally motivated to overcome the challenges posed by DBSS, and have begun to incorporate CG in their co-management of these schemes in certain cities.

Over time, it has become clear that CG is well-suited to resolving some of the tricky governance issues raised by DBSS; issues so complex that no single organisation can handle them alone due to the deeper structural tensions caused by multiple factors and factions (Ma et al., 2018). Once the framework for CG of DBSS in a sharing city is established, it can be an important first step towards creating a win-win outcome for all stakeholders, and moving towards sustainable urban living (Agyeman and McLaren, 2017). However, how CG frameworks applied to DBSS unfold in the real world is highly dependent on the local socio-economic, political, and institutional context, and thus needs to be examined closely at the city-scale.

### **1.3 Research aims and objectives**

#### **1.3.1 Research aims**

My primary research aim was to examine the urban collaborative governance processes and innovations that emerged in response to the rise of DBSS in global cities between 2017 and 2021. To do this, I conducted a comparative analysis of the governance approaches to DBSS in Nanjing, China and Sydney, Australia. I have applied Emerson et al. (2012)'s Integrative Framework for Collaborative Governance to both case studies. I have focused, in particular, on the dynamic interactions between two key

actors involved in the CG of DBSS: government representatives, and private enterprises.

### **1.3.2 Research objectives**

This thesis has six interlinked research objectives. First, to review key ideas and theories on CG, cross-sectoral collaboration, the sharing economy, bike-sharing, and the sharing city, specifically focusing on how CG of DBSS has been conceptualised and implemented. Second, to conduct a systematic review of existing DBSS literature, aiming to identify research gaps to develop and inform the main research questions and methodological strategies of this thesis. The third objective is to examine the specific contexts affecting the form and nature of CG in China and Australia, by identifying key socio-economic and cultural characteristics, policy frameworks, and institutional systems (with a specific focus on how these contexts shape the CG of DBSS in Nanjing and Sydney).

The fourth research objective is to identify, compare and contrast the different (or similar) dynamics of CG of DBSS in these urban cities through a comparative case study approach. The fifth objective is to conceptualise these differences and similarities in approach and outcome in Nanjing and Sydney according to existing collaborative governance models. The sixth and final research objective is to synthesise the research

findings and draw out key theoretical and policy implications for the CG of DBSS in any sharing city.

#### **1.4 Research significance and contribution**

This thesis makes a significant contribution to the existing scholarship on CG as an effective mode of managing the sharing economy. My in-depth case study approach will also be a useful addition to the growing body of literature on governance of DBSS in global cities.

Much previous research on CG has focused on the benefits of cross-boundary collaborations in addressing the governance dilemmas raised by the urban sharing economy (with a focus on DBSS as one domain of the sharing economy). However, there has not been much substantial research that investigates how actors in a CG scheme collaborate with one another in various urban contexts, and which factors are critical to the success of the collaboration process.

The major contribution this thesis makes is to present two comparative empirical case studies (from Nanjing, China and Sydney, Australia) of the dynamic interactions of government and private DBSS enterprises in these two very different socio-cultural and political contexts.

By closely tracing how these actors work collaboratively to resolve governance problems linked to DBSS, and delineating exactly *which* contextual factors most strongly affect the collaboration process, this thesis contributes a much deeper understanding of the on-the-ground realities of sustainably governing the sharing economy in practice. Based on these empirical findings, this thesis also provides some original suggestions to urban planners, policymakers, and practitioners on how to improve future DBSS management, policy, and practice.

In terms of the methodological contributions and innovations of this thesis, it is the first body of empirical research to use a comparative case study strategy to carry out in-depth research on the CG of DBSS both in China and outside of China. This approach has allowed me to take into account how a range of factors – including property rights, economic models, policy and legal systems, power dynamics, and governance frameworks – impact the CG of DBSS in different contexts. These research insights can be applied by any future researchers who aim to understand – in more fine-grained detail – how CG works in practice in cities and regions across the world.

From a theoretical standpoint, most of the existing literature on the urban governance of DBSS does not apply any theoretical tools or frameworks that could help to make practical findings about DBSS relevant to wider related fields (such as urban policy,



conflict resolution, or climate change governance). This thesis is the first empirical research on DBSS to also fully apply a theoretical framework: Emerson et al. (2012)'s Integrative Framework for Collaborative Governance. I use this framework as a lens through which to observe a new phenomenon (DBSS governance) in two global cities. I apply this framework to draw out theoretical insights with wide relevance in related fields of study. This also contributes to the development and expansion of Emerson et al. (2012)'s framework itself.

Last but certainly not least, this thesis also supports and promotes the values of sustainable development and equitable public participation in urbanisation, in accordance with the United Nations Sustainable Development Goals and New Urban Agenda (de Villiers et al., 2021).

## **1.5 Thesis structure and organisation**

This thesis adopts a 'thesis by compilation' approach that has been encouraged by the Institute for Sustainable Futures (ISF) at the University of Technology Sydney (UTS). This involves writing a thesis around papers published throughout the course of a PhD. As a result, this thesis contains five peer-reviewed journal papers that form the basis of the literature review, methodology, empirical and discussion chapters. This approach is justified due to the rapid changes within the study and practice of CG of DBSS around the world. As such, this research is better positioned to contribute to gaps in knowledge

and to improve real-world practice, since the findings have been published and shared as they emerge.

There are a few things to note in terms of the thesis structure. The published (or submitted for publication) papers are incorporated within each chapter, and organised by their contribution to an overarching literature review, methodological outline, research questions, and discussion of findings. Since each paper has its own reference list, it made sense to include references at the end of each chapter, but there is also a complete list of references in the bibliography at the end of this thesis.

Finally, due to each published (or submitted) journal paper needing to provide the same background context on the overall research project, there may be occasional instances of repetition (for example, each journal paper includes discussion sections that consider practical and theoretical implications, as well as research gaps and future recommendations). For this reason, in the discussion and conclusion chapters (**Chapter 6** and **Chapter 7** of this thesis), I have tried to avoid repeating any already presented discussion topics, and made a concerted effort to add only new content to these sections.

This thesis is divided into seven chapters. I will discuss the contents of each chapter in more detail in the paragraphs below, but in summary:

- In **Chapter 1** (this section), I discuss my research motivations and describe the wider research context;
- In **Chapter 2**, I present a thematic literature review of the existing literature;
- In **Chapter 3**, I summarise the research methods used in studies of DBSS, and explain the methodological strategies adopted in this thesis;
- In **Chapters 4 – 6**, I present my findings and a discussion of these findings;
- In **Chapter 4** and **Chapter 5**, I report on – and analyse – the empirical findings from my two case studies of CG of DBSS (in Nanjing, China and Sydney, Australia);
- In **Chapter 6**, I critically discuss the empirical findings and construct two development models of collaborative governance, from which I draw theoretical and policy implications;
- Finally, in **Chapter 7**, I summarise my key ideas and findings in response to this thesis's research questions, discuss the necessary limitations of my research, and suggest recommendations for future research.

Following this introductory chapter, **Chapter 2** presents a systematic review of existing sharing economy and DBSS literature. This review paper has been published in a double-blind peer-reviewed journal (*Cleaner Engineering and Technology*) in 2021. As the first author, my attribution of the authorship of this published paper is about 80%. The chapter offers a thematic analysis of the development theories and practices of CG

of DBSS in global cities. It focuses on the inherent characteristics of the sharing economy and its externalities underpinning the governance of DBSS, rebalancing strategies for DBSS, government regulation of DBSS, and cross-sectoral public-private collaboration in the governance of DBSS.

**Chapter 3**'s objective is twofold: a methodological review, and an explanation of my research design. The first section reviews the empirical methodologies used in the field, through a scientometric review approach to DBSS governance from 2017 to 2021. This review paper has been submitted to a double-blind peer-reviewed journal (*Sustainability*) in late 2022. Currently, the status of this paper is 'under revision.' As the sole author, my attribution of the authorship of this paper is 100%. This literature review analyses factors such as research paradigms, number and type of respondents, time horizon, research sample size, and theoretical underpinnings, revealing the dominant research preferences of DBSS researchers in the field of DBSS governance. Informed by the methodological review section, the second half introduces and applies the analytical framework that informs the theoretical basis of my research, and explains the overall research design.

**Chapter 4** empirically investigates the CG frameworks and collaborative dynamics of Nanjing and Sydney's DBSS using several theoretical variables from Emerson et al. (2012)'s Integrative Framework for Collaborative Governance. This research paper has

been published in a double-blind peer-reviewed journal (*Urban Policy and Research*) in 2022. As the first author, my attribution of the authorship of this published paper is about 80%.

The raw data used for this chapter is primarily drawn from the semi-structured interviews and other qualitative research material collected in Nanjing. The published paper identifies the public-private governance framework of DBSS in Nanjing as an ‘authoritarian’ style of CG led by Nanjing’s local government, which gave it the advantage of being able to quickly mobilise resources and fast-track decision-making, in turn helping to alleviate the pressures created by DBSS in the city.

**Chapter 5** empirically investigates the CG frameworks and collaborative dynamics of Sydney’s DBSS using certain theoretical variables from Emerson et al. (2012)’s Integrative Framework for Collaborative Governance. This research paper has been published in a double-blind peer-reviewed journal (*Sustainability*) in 2022. As the first author, my attribution of the authorship of this published paper is about 85%.

The raw data used in this chapter is also primarily based on the semi-structured interviews and other qualitative research materials collected in Sydney. The published paper identifies the governance of DBSS in Sydney as a ‘self-organising’ type of CG. In contrast to the ‘authoritarian’ CG of Nanjing’s DBSS, the ‘self-organising’ CG of

Sydney's DBSS is co-led by public and private actors, and focuses more on the inclusivity of the collaborative process and building trust, which is helpful to the long-term survival and sustainability of the collaboration.

**Chapter 6** is a discussion of my research findings, and is split into two parts. The first part discusses how contextual factors, especially power relations between actors, affect the CG of Nanjing and Sydney's DBSS. This section has been shaped into a discussion paper and published by a *Nature* research journal (*Humanities and Social Sciences Communications*) in 2022. As the first author, my attribution of the authorship of this paper is more than 85%.

The second part of **Chapter 6** discusses the similarities and differences in the collaborative dynamics, outcomes and adaptations of the CG of Nanjing and Sydney's DBSS. The objective of this section is to summarise the broader practical, policy and theoretical implications of the CG of DBSS practices in Nanjing and Sydney, and to discuss the applicability of Emerson et al. (2012)'s Integrative Framework for Collaborative Governance in analysing the governance of DBSS (while also proposing several suggested revisions).

**Chapter 7** reconsiders how my key research questions have been answered by drawing on the empirical findings from **Chapter 4** and **Chapter 5**. This concluding chapter

discusses the necessary limitations of my research, and suggests recommendations for future research.

## References

- Agyeman, J. & McLaren, D. (2017). *Sharing Cities: A Case for Truly Smart and Sustainable Cities*. Cambridge, Massachusetts: MIT Press.
- Ansell, C. & Gash, A. (2008). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research & Theory*, 18 (4), 543-571.
- Badiane, K., Xi, Z., Wui, W. & Bayala, V. (2020). Development of the Sharing Economy in China: The Interaction between Bike-Sharing and Urban Governance. *American Journal of Humanities and Social Sciences Research*, 12 (4), 32-42
- Belk, R. (2010). Sharing. *Journal of Consumer Research*, 36 (5), 715-734.
- Botsman, R. & Rogers, R., 2010. *What's mine is yours: the rise of collaborative consumption (1st ed.)*. New York City: Harper Business.
- Cao, J., Prior, J., Giurco, D. & Gu, D. (2023). Power relations are central to shaping collaborative governance of the urban sharing economy. *Humanities and Social Sciences Communications*, 10 (1), 85.
- Chen, R. (2019). "Bike litter" and obligations of the platform operators: Lessons from China's dockless sharing bikes. *The Computer Law and Security Report*, 35 (5), 105317.
- Curtis, S. K., & Mont, O. (2020). Sharing economy business models for sustainability. *Journal of Cleaner Production*, 266, 121519.
- Demaio, P. (2009). Bike-sharing: History, Impacts, Models of Provision, and Future. *Journal of Public Transportation*, 12 (4), 41-56.
- De Villiers, C., Kuruppu, S. & Dissanayake, D. (2021). A (new) role for business – Promoting the United Nations' Sustainable Development Goals through the internet-of-things and blockchain technology. *Journal of Business Research*, 131 (2), 598-609.
- Eckhardt, G.M. & Bardhi, F. (2015). *The sharing economy isn't about sharing at all*. Available via *Harvard Business Review*. <https://hbr.org/2015/01/the-sharing-economy-isnt-about-sharing-at-all>. Accessed January 28, 2015.



- Emerson, K., Nabatchi, T. & Balogh, S. (2012). An Integrative Framework for Collaborative Governance. *Journal of Public Administration Research & Theory*, 22 (1), 1-29.
- Fishman, E. (2016). Bikeshare: A Review of Recent Literature. *Transport Reviews*, 36 (1), 92-113.
- Fishman, E. (2019). *Bike Share (1st ed.)*. Oxfordshire, UK: Routledge.
- Garud, R., Kumaraswamy, A., Roberts, A. & Xu, L. (2022). Liminal movement by digital platform-based sharing economy ventures: The case of Uber Technologies. *Strategic Management Journal*, 43 (3), 447-475.
- Gu, T., Kim, I. & Currie, G. (2019). To be or not to be dockless: Empirical analysis of dockless bikeshare development in China. *Transportation Research. Part A: Policy and Practice*, 119, 122-147.
- Hamari, J., Sjöklint, M. & Ukkonen, A. (2016). The sharing economy: Why people participate in collaborative consumption. *Journal of the Association for Information Science & Technology*, 67 (9), 2047-2059.
- Jia, L., Liu, X. & Liu, Y., 2018. Impact of Different Stakeholders of Bike-Sharing Industry on Users' Intention of Civilized Use of Bike-Sharing. *Sustainability*, 10 (5), 1437.
- Jiang, Q., Ou, S.-J. & Wei, W. (2019). Why Shared Bikes of Free-Floating Systems Were Parked Out of Order? A Preliminary Study based on Factor Analysis. *Sustainability*, 11 (12), 3287.
- Kim, T. (2010). Collaborative Governance for Sustainable Development in Urban Planning in South Korea. Dissertation, The University of Birmingham.
- Ma, Y., Lan, J., Thornton, T., Mangalagu, D. & Zhu, D.J. (2018). Challenges of collaborative governance in the sharing economy: The case of free-floating bike sharing in Shanghai. *Journal of Cleaner Production*, 197, 356-365.
- NLC. (2011). *Integrating Bike Share Programs into a Sustainable Transportation System*. Available via [www.scribd.com](http://www.scribd.com) of subordinate document. Accessed 11 Feb 2017.

- Parkes, S.D., Marsden, G., Shaheen, S.A. & Cohen, A.P. (2013). Understanding the diffusion of public bikesharing systems: evidence from Europe and North America. *Journal of Transport Geography*, 31, 94-103.
- Pieterse, E.A. (2000). *Participatory Urban Governance: Practical Approaches, Regional Trends, and UMP Experiences*. UMP discussion paper. Published by the Urban Management Programme, UNCHS (Habitat).
- Shaheen, S.A., Guzman, S. & Zhang, H. (2010). Bikesharing in Europe, the Americas, and Asia: Past, Present, and Future. *Transportation Research Record*, 2143 (1), 159-167.
- Shi, J.G., Si, H.Y., Wu, G.D., Su, Y.Y. & Lan, J. (2018). Critical Factors to Achieve Dockless Bike-Sharing Sustainability in China: A Stakeholder-Oriented Network Perspective. *Sustainability*, 10 (6), 2090.
- Swiss Federal Office for Energy (SFOE). (2006). *Evaluation Car-Sharing*. Available via [www.bfe.admin.ch](http://www.bfe.admin.ch) of subordinate document. Accessed 11 Jan 2017.
- Zhao, D. & Wang, D. (2019). The Research of Tripartite Collaborative Governance on Disorderly Parking of Shared Bicycles Based on the Theory of Planned Behavior and Motivation Theories - A Case of Beijing, China. *Sustainability*, 11 (19), 5431.
- Zhu, D.J. & She, Y.S. (2017). From possession to use: an interview with Dajlan Zhu on sharing economy and sharing city. *Landscape Architecture Frontiers*, 5 (3), 32-39.

# Chapter 2: Literature Review

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## **Paper preface**

This chapter includes a re-formatted, co-authored peer-reviewed paper. The full citation for the paper, including all authors, is:

**Cao, J.**, Prior, J., Moutou, C. (2021). The governance of dockless bike-sharing schemes: A systemic review of peer-reviewed academic journal papers between 2016 and 2019. *Cleaner Engineering and Technology*, 4, 100-140.

## **Statement of contribution**

Jun Cao mainly contributed to the ideas contained in this paper. Jun Cao collected the data and wrote the manuscript. Jason Prior supervised the overall work and polished the wording of this paper. Claudine Moutou provided constructive advice to improve the manuscript.

## **Research highlights**

The research article highlights included in the online version of the journal article are as follows:

1. Systematic review of governance in DBSS-related journal papers between 2016 and 2019;

2. 95 journal papers written in English and Chinese were identified (the majority of which were in Chinese);
3. Over time, these journal papers shifted focus, from problem-finding and defining to problem-solving;
4. Early papers explored the sharing economy, property rights, externalities and rebalancing strategies;
5. Later papers examined government regulations and cross-boundary governance.



## The governance of dockless bike-sharing schemes: A systemic review of peer-reviewed academic journal papers between 2016 and 2019

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### Abstract

Since dockless bike-sharing systems (DBSS) first arose in China in 2016, studies have examined their governance. However, there has been no comprehensive review of the literature on DBSS. This paper presents the first systematic review of the burgeoning literature on the governance of DBSS. It maps key research themes, identifies research trends and provides a deeper understanding of the governance literature on DBSS. We searched the Web of Science (WoS), Scopus and China National Knowledge Infrastructure (CNKI) databases to identify 95 papers written in English or Chinese between 2016 and 2019 that address the governance of DBSS. A thematic coding of these papers was supported by bibliometric analysis and knowledge mapping using the VOSviewer. More papers are written in Chinese than in English, focusing on Chinese cities. Although the time range of our literature search was between 2016 and 2019, the first paper was published in 2017. Four key themes in the governance of DBSS were identified within the papers, and over time, the papers shifted their focus from problem-finding and problem-defining to problem-solving. Discussion of the inherent characteristics of the sharing economy and the externalities underpinning the

governance of DBSS (Theme 1) and rebalancing problems for DBSS (Theme 2) first arose in early 2017, whilst discussions of the government regulation of DBSS (Theme 3) and the cross-boundary governance models underpinning DBSS (Theme 4) first arose in mid-2017. This paper concludes with a discussion of the identified themes and trends in the context of the broader literature on bike-sharing and identifies opportunities for further research.

### **Keywords**

Dockless bike-sharing systems (DBSS), sharing economy, rebalancing, government regulation, collaborative governance

## 2.1 Introduction

In recent decades there has been an increased focus on the development of socially, economically and environmentally sustainable transport systems that can help to tackle climate change, create liveable places, reduce congestion and pollution, and support the health and well-being of communities (Shi et al., 2018). As part of this focus, academic literature is paying increasing attention to bike-sharing schemes (BSS) (Guo et al., 2017), which have been identified as a sustainable transport strategy that is contributing to the transformation of urban transport systems across the world (Ma et al., 2018).

BSS generally refer to enterprises and/or governments providing access to bike-sharing services in urban public spaces (Jiang and Cai, 2017) that can be used instead of – or as a supplement to – cars, buses, trains, and walking. BSS have evolved from ‘dockless’ to ‘docked,’ and back to ‘dockless’ (Wang et al., 2019). First-generation BSS saw the emergence of ‘White Bikes’ in Amsterdam in 1965. These could be taken anywhere and left unlocked for the next user. The service was discontinued after bikes were thrown into canals or stolen (DeMaio, 2009).

In 1991, the second generation of BSS, ‘City Bikes,’ arose in Denmark (Yue and Hu, 2019). Key features of second-generation BSS were fixed docking stations and coin access. This was an improvement, but this form of BSS was still vulnerable to theft due to the anonymity of users (Mateo-Babiano et al., 2017). The third generation of BSS, called ‘Vélos à la carte,’ was launched in 1998 in France. It was also a docked system, but it replaced coin access with smart card access so that bike users could be

traced, and in 2005, it further improved the tracking of bikes through the use of global positioning systems (GPS). Due to the constraints caused by fixed docking stations, usage rates for third-generation BSS were low (Shi et al., 2018).

The fourth generation of BSS, which is the focus of this review, emerged in China in 2016 (Jian-gang Shi et al., 2018). This system was dockless, but retained the use of smart card access (linked to smartphones) and GPS to track bikes. This fourth-generation BSS has been given a variety of names, including ‘Dockless BSS’ (Sun, 2018), ‘Stationless BSS’ (Heymes and Levinson, 2018), ‘Station-free BSS’ (Chengcheng Xu et al., 2018), and ‘Free-floating BSS’ (Ma et al., 2018). We use the term ‘Dockless BSS’ (DBSS). DBSS is arguably more flexible and cheaper than its predecessors, and it provides easier access (Sun, 2018) because bikes can be unlocked and paid for using a smartphone and can be picked up and left anywhere (Jia et al., 2018). Since 2016, DBSS enterprises, including Ofo and Mobike, have launched DBSS in cities throughout the world (Wang, 2017). Mobike’s website indicates that it currently provides DBSS for more than 200 million users in over 200 cities in 20 countries (Mobike, 2017).

The systematic review of the burgeoning peer-reviewed literature on DBSS presented within this paper is unique in two ways. Firstly, whilst prior reviews focused on various aspects of BSS, including users’ travel behaviour (Fishman, 2016), user experience (Fishman et al., 2013), and relevant socio-economic impacts (Si et al., 2019), this is the first systematic literature review to focus on the governance-related issues of DBSS. Effective governance has been identified as a key dimension of the sustainability of DBSS (Ma et al., 2018), and BSS more broadly (Ricci, 2015). This



review maps key research themes, identifies research trends, and provides a deeper understanding of the governance literature on DBSS. Secondly, whilst prior reviews have focused exclusively on English literature, this is the first review of both English and Chinese literature on DBSS. This is important given that DBSS first emerged in China (Du and Cheng, 2018). The review examines published peer-reviewed academic journal papers written on the governance of DBSS in both English and Chinese between 1 January 2016 and 31 December 2019.

This paper begins with an outline of its systematic approach (Section 2), then presents an overview of the literature and the key themes on governance (Section 3). It then discusses these key themes in relation to earlier BSS literature reviews (Section 4) and concludes by providing policy recommendations and identifying gaps within the literature and possible directions for future research on the governance of DBSS (Section 5).

## **2.2 Method**

### **2.2.1 Search strategy**

A literature search was carried out using three databases: Web of Science (WoS), Scopus, and China National Knowledge Infrastructure (CNKI) for papers published between 1 January 2016 and 31 December 2019.

### **2.2.2 Search terms**

Search terms were used in combination with the Boolean operators “AND”, “OR” and “NOT”, which allowed the researchers to combine search concepts and synonyms or eliminate terms. Truncated symbols were also used to include all words starting with the same order of letters (for example, the symbol \* means other forms of the keyword, such as “bike” and “bikes”). The searches in WoS and Scopus were performed using different terms to name the bike-sharing system: “TS= (“bike sharing” OR “sharing bike” OR “bike sharing” OR “bike share\*” OR “shared bike\*” OR “bike-sharing” OR “shared bike\*” OR “free floating bike sharing\*” OR “dockless bike sharing\*” OR “station-less bike sharing\*” OR “station-free bike sharing\*”). These keywords were translated into Chinese for use in CNKI’s search system.

### **2.2.3 Inclusion criteria**

Papers were reviewed if they were: (a) peer-reviewed academic journal papers, (b) written in English or Chinese, (c) published between 1 January 2016 and 31 December 2019, and (d) related to DBSS governance (e.g., governance issues, governance modes, policies, laws, institutions, cross-boundary collaborations and rebalancing).

### **2.2.4 Exclusion criteria**

The following were excluded from the review: (a) conference papers, book chapters, editorial material, reports and grey literature (e.g., theses, meeting abstracts and retracted publications), (b) duplicates of prior studies, (c) papers which focused on docked BSS, and (d) papers which did not address the governance of DBSS.

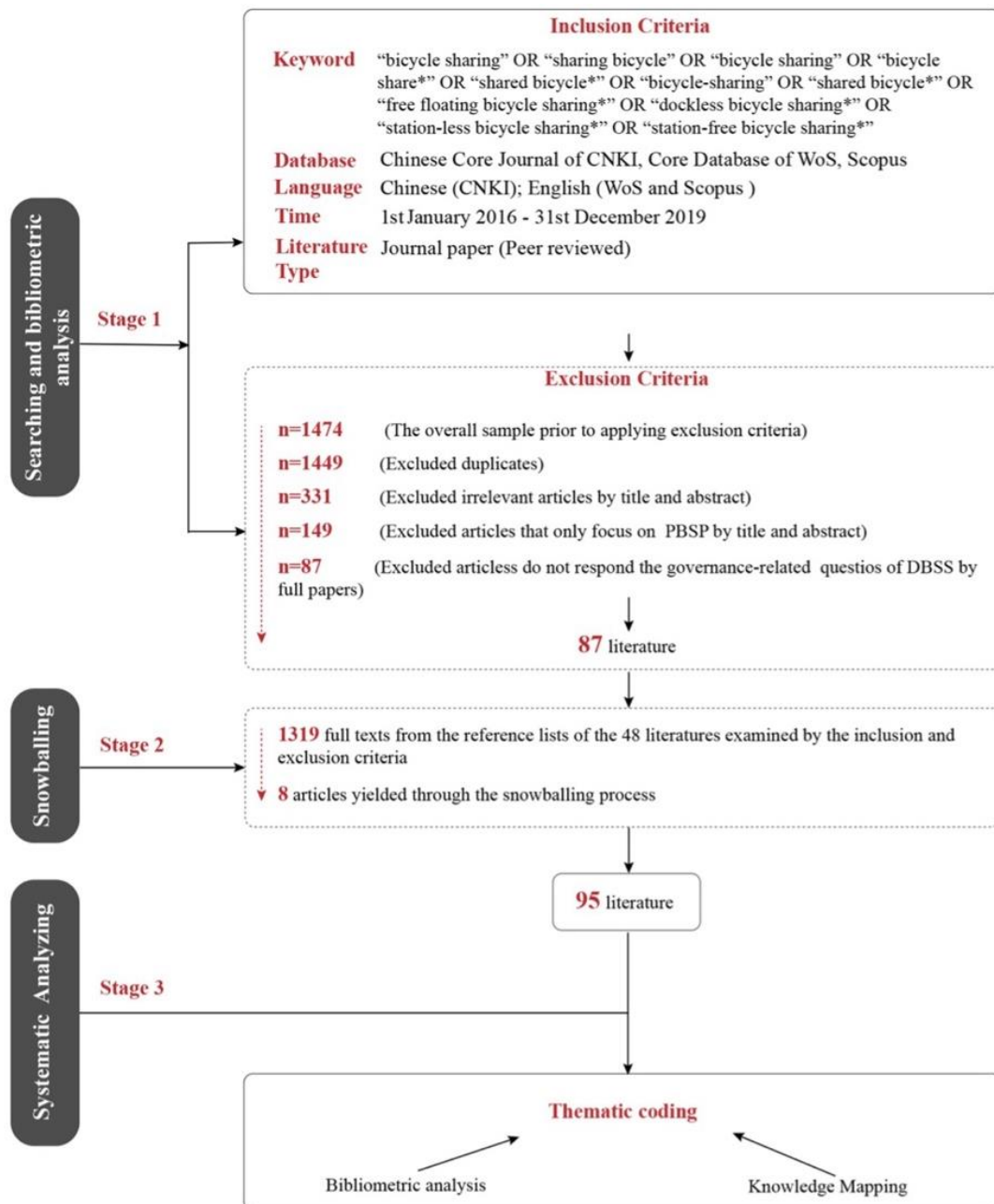
### **2.2.5 Review procedure**

A researcher, with verification from a second researcher, assessed the eligibility of studies. The review procedure is summarised in Figure 1. Firstly, WoS (n=213), Scopus (n=925) and CNKI (n=336) searches were performed, and all titles and abstracts were scanned for the presence of inclusion and exclusion criteria. When a decision could not be made based on a paper's abstract, the full text was reviewed. Where duplicate papers were identified, only the earliest paper was retained. This first step yielded 87 papers (33 from WoS, 3 from Scopus and 51 from CNKI).

In the second step, backward snowballing was performed on the reference lists of the 87 papers identified in Step 1 to identify additional papers. Through this process, 1,319 full texts had to be further examined for possible inclusion. We read the abstracts and the full texts of these papers to determine whether they met all the inclusion criteria discussed above. This yielded 8 additional papers (3 in English and 5 in Chinese) for a total of 95 papers (39 in English and 56 in Chinese).

The final step involved identifying key themes on the governance of DBSS within the 95 papers (see Table 1). All papers were thematically coded (Gibbs, 2007). Coding involved one researcher reading all papers in their entirety to identify passages or images that were linked by a common theme related to the governance of DBSS. The identified themes were verified by a second researcher. Two other analytical tools were used to help identify key themes:

1. The bibliometric visualisation analysis tools in the WoS, Scopus and CNKI databases were used to provide an overview of the research situation, such as countries and disciplines;
2. A knowledge map of authors' keywords within the papers was developed using VOSviewer.



**Figure 1** The review procedure

## 2.3 Results

### 2.3.1 Overview of DBSS literature on governance

Whilst the time range of our literature search was 1 January 2016 to 31 December 2019, no literature was found for 2016. The first paper (Guo et al., 2017) was published in mid-2017. We found more papers written in Chinese (n=56) than in English (n=39).

The authors of the 95 papers came from 12 countries and regions: China (n=88), USA (n=7), UK (n=6), France (n=3), South Korea (n=2), Netherlands (n=2), Australia (n=2), Germany (n=1), Denmark (n=1), Iran (n=1), Italy (n=1), and Taiwan (n=1). Most papers (n=88) focus on DBSS in Chinese cities. Only a few (n=7) discuss DBSS in cities outside China, including Seoul, Paris and Seattle.

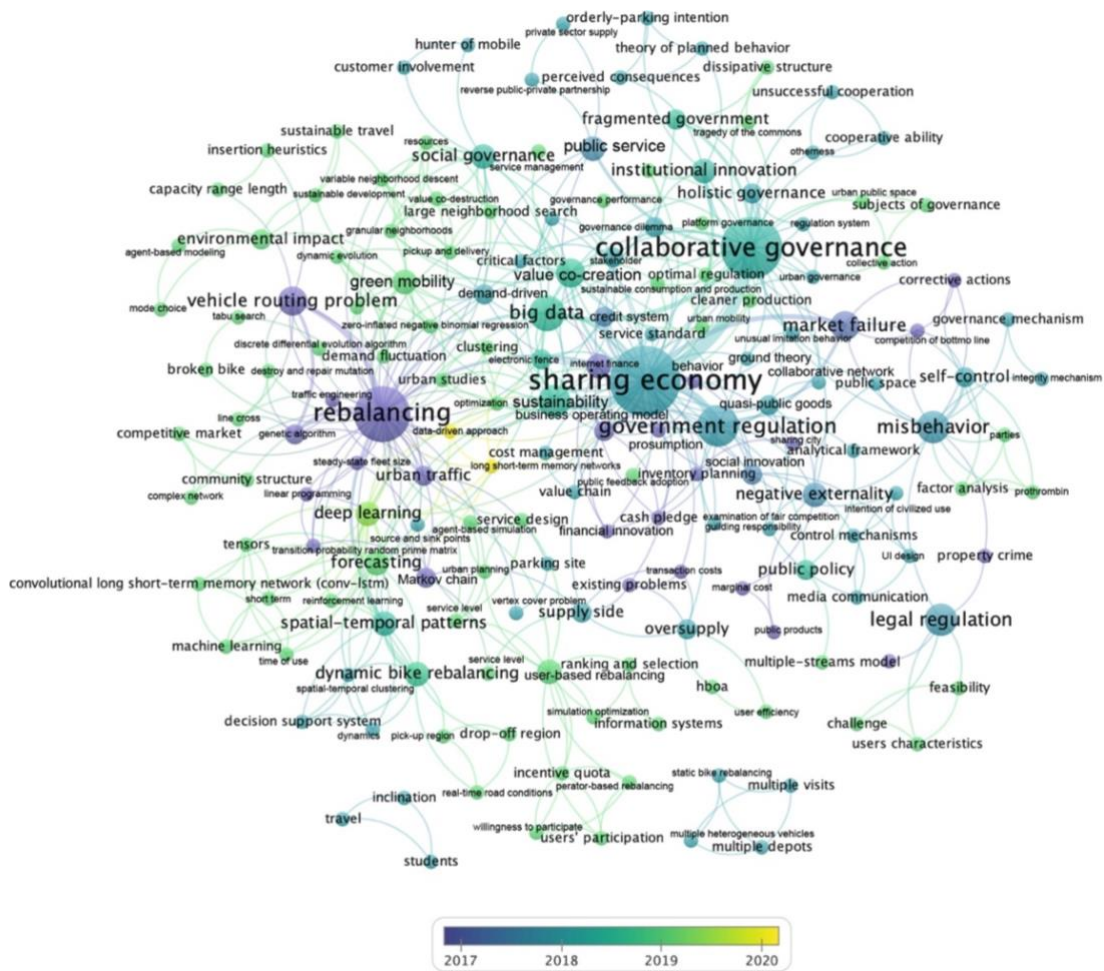
Four key themes related to governance were identified. Theme 1 is the characteristics of the sharing economy and the externalities that underpin the governance of DBSS. Theme 2 is rebalancing strategies for DBSS. Theme 3 is the government regulation of DBSS, and Theme 4 is the use of governance models to explain DBSS (see Table 1). Within the 95 papers, discussion of the economic models, property rights and externalities underpinning DBSS, and rebalancing strategies (Themes 1 and 2) first arose in the first half of 2017, whilst discussions of the challenges of government and legal regulation, and the governance models underpinning DBSS (Themes 3 and 4), first arose in the second half of 2017. The number of papers addressing Theme 4 increased rapidly in 2018 (see Figure 2). Key concepts in each theme are listed in Table 1, and an overview of each of the 95 selected papers is provided in Appendix A.

**Table 1** Key themes and associated keywords

No	Theme	Number of high frequency keywords addressing each theme	High frequency keywords included in each theme
1	The inherent characteristics of the sharing economy and	64	Sharing economy (25), sustainability (6), value co-creation (5), internet finance (3), green mobility (3), urban traffic (2), supply side (2), oversupply (2), negative

	its externalities underpinning the governance of DBSS		externality (2), disorderly parking (2), business operating model (2), quasi-public goods (2), market failure (4), misbehaviour (4)
2	Rebalancing strategies for DBSS	45	Rebalancing (14), vehicle routing problem (4), big data (6), deep learning (3), Markov chain (2), dynamic bike rebalancing (3), spatial temporary patterns (4), user-based rebalancing (3), genetic algorithm (2), demand driven (2), forecasting (2)
3	The government regulation of DBSS	35	Government regulation (10), policy (5), fragmented government (2), legislation (5), government dilemma (2), credit system (2), institution innovation (3), public service (3), self-control (2)
4	The cross-boundary collaboration in the governance of DBSS	28	Collaborative governance (19), stakeholder (2), social governance (5), intelligent governance (2)

The 95 papers came from a range of disciplines: public management (n=35), transport (n=32), business (n=14), environmental science (n=12), law (n=7), policy research (n=4), green sustainable science technology (n=2), energy (n=1), regional urban planning (n=1) and geography (n=1). Discussion of the sharing economy and its externalities (Theme 1) was most prevalent in the field of economy. Discussion of rebalancing problems associated with DBSS (Theme 2) was most prevalent in the transport studies. Discussion of the challenge of DBSS to traditional government and the rise of DBSS governance (Themes 3 and 4) was most prevalent in the public management and policy research papers, but they were also discussed in some engineering, environmental science and geography papers.



**Figure 2** Visualisation of key concepts arising in the 95 papers over time (This diagram highlights all keywords in the 95 papers selected for this study. The scale of key concept nodes in the diagram is representative of the number of papers that address that keyword. See Table 1 for details on how many papers addressed each high-frequency keyword).

### 2.3.2 Theme 1: The inherent characteristics of the sharing economy and its externalities underpinning the governance of DBSS

An early and ongoing theme discussed in 28 of the 95 papers was the inherent characteristics and externalities of DBSS that underpin the governance of DBSS, and the impacts these characteristics may have (for the titles of papers discussed in Theme 1, see Appendix A).



25 of the 28 papers that discuss Theme 1 argue that DBSS is part of the sharing economy. The sharing economy is broadly defined as including the customer-to-customer (C2C) model and the business-to-customer (B2C) model (Zhu and She, 2017; Mont et al. 2020). In these papers, the sharing economy associated with DBSS, whether C2C or B2C, is generally understood as an example of a new economic model created by sharing social and public services. This involves a shift from ownership to accessibility or from possession to use. The result is collaborative consumption in which “mine is yours, and yours is mine” (Han and Chen, 2019). However, few papers argue that DBSS is not part of the sharing economy and could more accurately be described as an “atypical-sharing” (Wang and He, 2017) or “pseudo-sharing” (Han and Chen, 2019). This is based on the view that the sharing economy involves the exchange of idle resources between customers, and shared bikes are produced in response to user demand (Han and Chen, 2019). This view argues that DBSS is equivalent to traditional short-term rental, except in its use of internet technology to enable “intelligent rental.” Zhu and She (2017) have criticised this view as involving a narrow understanding of the sharing economy. Although DBSS is not the sharing of idle resources, as the right of use is shared by many, it still largely falls into the category of a sharing economy.

The DBSS characteristics mentioned above led to changes in property rights structures, and separated ownership and accessibility (Ma et al., 2018). DBSS enterprises retain ownership of the bikes and enable different users to transfer the right to use a bike at different times with almost zero marginal cost (Leng and Guo, 2018). These unique property rights led to a further discussion on the economic attributes of DBSS. In public goods theory, goods available for non-exclusive, non-competitive consumption

are defined as ‘public goods’ (Zhao and Wang, 2019). Goods with only one of the characteristics of public goods are referred to as ‘quasi-public goods.’ DBSS cannot produce crowding effects and are endowed with non-competitiveness. However, whilst the bikes are accessible to the public, this accessibility is not free (Gan and Lou, 2018). Jiang and Cai (2017) thus argue that DBSS provide a ‘quasi-public good’ with utility exclusiveness and non-consumer competitiveness. A few papers argue this description is inaccurate because DBSS exclude people who don’t want to pay (Leng and Guo, 2018) and are highly competitive in places where demand is high (e.g., bus stations, subway stations, and residential areas) and during high-demand periods (Han and Chen, 2019). Hence, the attributes of DBSS are hard to encapsulate using traditional public good theory because these attributes change due to spatio-temporal factors.

Due to the transferability of disposal rights and its homological demands, DBSS often suffer what is known as the “tragedy of the commons” (Hardin, 1968), where things shared by many people are unprotected and more likely to be damaged. Seven of the 28 papers discuss the negative externalities of DBSS. There are two main types of negative externalities: those associated with the operators, and those associated with the users. The former refers to the waste and idleness of resources caused by DBSS enterprises attempting to expand their market share by flooding urban spaces with more and more bikes. This strategy is often called “burn money” (Zheng and Li, 2018). It leads to an oversupply of bikes and congestion of urban spaces (Ma et al., 2018). The latter refers to the misuse of bikes, which produces a negative image of the service. These negative externalities are associated with adverse impact on others when, for example, in Chinese cities – if the fleet size is large – users park bikes haphazardly

and block roadways (Yao et al., 2019). In cities outside China (e.g., Paris, Brussels, Dallas and Seattle), vandalism and theft are the most severe problems (Hauf and Douma, 2019).

Some people have stolen parts from shared bikes or even locked shared bikes and claimed them as their own (Chen, 2019). Another commonly discussed negative externality is the ‘unbalanced’ spatio-temporal distribution of bikes, which requires heavy rebalancing work. This increases operating costs and truck usage. Bike rebalancing causes many car accidents, which could offset the benefits of DBSS and intensify traffic congestion (Ban and Hyun, 2019). In China, the annual rebalancing costs of Ofo and Mobike are RMB 400 million yuan and 500 million yuan, respectively (Nie and Zhang, 2018).

Seven of the 28 papers argue that DBSS provides a number of positive externalities. According to these papers, the positive effects of DBSS include the “supplement effect” (Qiu and He, 2018). DBSS is a convenient tool to address the “last mile” and “first mile” problem of public transportation (Wang, 2018). DBSS integrates with and extends current urban public transport modes. The ‘bike + bus/metro + bike’ trip is seen as improving the efficiency of urban transport systems (Sun, 2018).

Secondly, through the “substitution effect” (Qiu and He, 2018), DBSS can partly replace travel modes that create heavy pollution and energy consumption (Weng, 2018), and contribute to efforts to conserve energy and reduce air pollution, noise pollution and carbon emissions (Shi et al., 2018). According to Wu et al. (2019), the

DBSS in Shanghai saved 8,358 tons of petrol and reduced CO<sub>2</sub> emissions by 25,240 tons in 2016. Moreover, although rebalancing work intensifies traffic congestion, DBSS help to alleviate traffic congestion through mode transfer from cars to bikes (Yao et al., 2019). Thirdly, through the “health effect” (Qiu and He, 2018), DBSS promote sustainable living (Shi et al., 2018).

### **2.3.3 Theme 2: Rebalancing strategies for DBSS**

Over a quarter of the papers (27 of 95) discuss rebalancing strategies, with a focus on how DBSS enterprises can improve efficiency by providing bikes to meet user demand at the lowest operational cost (for the titles of papers discussed in Theme 2, see Appendix 1). Discussion of rebalancing strategies generally focuses on two issues: forecasting the spatio-temporal distribution of bikes and user demand; and the optimisation of rebalancing strategies.

Most of the papers (16 of 27) that discuss rebalancing strategies argue that their efficiency depends on the accurate forecasting of dynamic demand. The aim of these forecasting processes, which often use mathematical modelling (Liu and Pan, 2019), is to predict how many parking slots should be planned and how many bikes should be at each slot (Jie et al., 2020). Various modelling techniques have been used to forecast the spatio-temporal distribution of bikes and user demand in Chinese and U.S. cities (Table 2). Despite the complexities involved, these papers identify several characteristics that generally guide rebalancing strategies (see Table 3).

Some papers focus on comparing the accuracy of different regression models. Ashqar et al. (2020) suggest that univariate models (e.g., Random Forest or RF) are the most accurate because they construct a multitude of decision trees using bootstrap samples and calculate the mean of the predictions of the individual trees. Unlike static and linear techniques (e.g., linear discriminant analysis and logistic regression), RF can model complex interactions between predictor variables automatically. The second such paper (Nguyen Thi Hoai et al., 2017) compared the accuracy of Similarity Weighted K Nearest Neighbor-based (SWK-based) regression and ANN-based prediction by testing the BSS of New York City. They found that the ANN achieved higher accuracy. However, they argue that the ANN cannot fully capture the characteristics of time-series data as it does not account for temporal dependencies.

Researchers have proposed using feed-forward deep neural networks. However, although recurrent neural networks (RNN) can account for temporal dependencies and predict time-series data, they are not suitable for use with time-series data with very long time lags (Hochreiter and Schmidhuber, 1997). Moreover, with RNNs, it is hard to find the optimal window size for modelling time-series data, as they rely on predetermined time lags for the temporal sequence processing (Xu et al., 2018). Xu et al. (2018) thus propose using long short-term memory neural networks (LSTM NN) to fit the time-series data of DBSS. Comparison findings indicate that the LSTM NN achieved higher accuracy than conventional statistical models and advanced machine learning methods for different time intervals (Xu et al., 2018).

**Table 2** Key modelling techniques used to forecast the spatio-temporal distribution of DBSS in selected papers

<b>Modelling techniques</b>	<b>Research aims</b>	<b>Location of the study</b>	<b>Papers</b>
Regional extraction	Analysing spatio-temporal distribution	Shanghai	Xie et al. (2019)
Least-squares boosting	Predicting the number of available bikes with related variables: the built environment, time effects, and weather conditions.	San Francisco	Ashqar et al. (2017)
Random Forest algorithm	Discovering spatio-temporal usage patterns	Shanghai; San Francisco	Du et al. (2019); Ashqar et al. (2017)
Partial Least-Squares Regression	Predicting the number of available bikes with related variables: the built environment, time effects, and weather conditions.	San Francisco	Ashqar et al. (2017)
Markov chain	Forecasting the riding transfer rate of bikes between stations and the optimal fleet size in each virtual station	None	Yan and Liu (2019); Zhai et al. (2019)
Long short-term memory neural network	Analysing the spatio-temporal distribution and trip pattern of users	Chengdu; Nanjing	Ai et al. (2019); Xu et al. (2018)
Statistical physics method	Dynamic evolution of demand fluctuation	Nanjing	Tian et al. (2019)
Zero-inflated negative binomial model	Analysing the influence of built environment on DBSS	Nanjing	Zhao et al. (2019)
Heuristic bike optimisation algorithm	Analysing the usage efficiency problem	Shenzhen	Gu et al. (2019)
Artificial neural networks	Forecasting the number and location of bikes over a DBSS operating area	Beijing	Caggiani et al. (2018); Nguyen et al. (2017)
Weighted K-Nearest-Neighbor	Predicting bike demand	New York City	Nguyen et al. (2017)

**Table 3** Key characteristics of the spatio-temporal distribution of DBSS and user demand

	<b>Characteristics</b>	<b>Location of the study</b>	<b>Papers</b>
<b>The characteristics of spatio-temporal distribution</b>	Maximum travel distances and travel times are in the morning rush hour (7:00–10:00), noon rush hour (11:00–13:00) and evening rush hour (17:00–18:00).	Chengdu; Nanjing; Beijing; Shanghai	Ai et al. (2019); Du et al. (2019); Gao et al. (2018); C. Xu et al. (2018); Zhao et al. (2019)
	The usage of bikes on weekdays is higher than weekends.	Beijing	Gao et al. (2018)
	During the morning weekday rush hours, bikes mostly travel from residential areas to business office and education areas, but the opposite is true during evening rush hours. On weekends, bikes mostly travel from residential areas to public leisure areas, with little difference between the morning and evening.	Beijing	Gao et al. (2018)
<b>The characteristics of users' demand</b>	Bikes are usually distributed in urban central areas, but almost no bikes are available in suburban areas, which also have a high demand.	Shanghai	Jie et al. (2020)
	Bikes are usually oversupplied in residential areas, transport stations, business offices, etc., but the number of bikes near industrial buildings, entertainment facilities, hotels, etc. cannot meet demand.	Chengdu; Beijing; Shenzhen; Shanghai	Ai et al. (2019); Gao et al. (2018); Z. Gu et al. (2019); Jie et al. (2020); Zhao et al. (2019)
	Usually, residential areas have the highest user demand, followed by industrial areas, public transport stations, business offices and commercial areas.	Chengdu; Nanjing	Ai et al. (2019); Du et al. (2019)
	Whether it's a working day or non-working day, industrial buildings, metro stations, municipal utilities,	Beijing; Shenzhen	Gao et al. (2018); Z. Gu et al. (2019)

	and railway land always have high user demand.		
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18 of the 27 papers examining rebalancing strategies argue that strategies in cities all over the world (e.g., Beijing, Shanghai, Singapore, Seoul) are either operator-based (15 of 18) or user-based (3 of 18). In operator-based strategies, rebalancing is performed by enterprise staff and trucks (Guan and Lu, 2019); in user-based strategies, users receive monetary incentives to leave bikes at locations where they are needed (Ban and Hyun, 2019). Research highlights inefficiencies and challenges in both types of strategies. The use of incentives in user-based strategies is challenging during peak times as self-rebalancing by users is time-consuming (Zhai et al., 2019). Moreover, the reward station is often too far from the user's original target station, and the small reward is not sufficient incentive (Yi et al., 2019). Operator-based strategies were found to have low efficiency and are sometimes time-consuming due to traffic congestion (Ban and Hyun, 2019). Given these inefficiencies and challenges, researchers have recently suggested a hybrid strategy that avoids the weaknesses of both strategies (Mahmoodian et al., 2022).

Operator-based strategies were further broken down into static approaches (8 of 15) and dynamic approaches (5 of 15), and two papers did not state which approach they focused on. Static approaches are used when user intervention is negligible (e.g., at night when demand is low). Dynamic approaches are used when the DBSS is active, and consider the real-time usage of bikes (Caggiani et al., 2018). Until recently, the dynamic approach has had limited implementation because of its complexity and high implementation costs, and has generally been restricted to large-scale DBSS programs during peak times (Lahoorpoor et al., 2019). However, it is increasingly being used



because static strategies lack the flexibility needed to provide timely rebalancing (He et al., 2019). Moreover, researchers argue that DBSS is better suited to dynamic rebalancing because the size of DBSS fleets is larger than docked BSS (Gu et al., 2019); and DBSS bikes are scattered across the urban space more broadly than in earlier docked BSS (Caggiani et al., 2018).

### **2.3.4 Theme 3: Government regulation of DBSS**

To address some of the negative externalities of public services, the traditional approach is for the local government to issue and enforce top-down rules (Chen, 2019). Many papers (27 of 95) discuss the emerging role of government in the regulation of DBSS (for the titles of papers included in Theme 3, see Appendix 1). A key focus in these papers is regulation in China, Australia, Europe and North America by local governments. However, in most cases, top-down government modes have failed to regulate DBSS effectively.

In Chinese cities, three major issues emerged post-launch. Firstly, the lack of government functions in the early stages of DBSS (Weng, 2018). According to (Fishman, 2016), DBSS enterprises initiated almost no communication with China's local governments (regional/city) prior to launching their services, which meant China's local governments had only a limited understanding of DBSS, and they also lacked policy and legal support from provincial and central governments. Consequently, many of China's local governments took a neutral stance to DBSS when they first appeared in 2016 (Chen, 2019), which led to a lag in DBSS regulation by local governments (Cheng and Qi, 2018).

This gave rise to the second issue: subordinate government departments didn't know who should be responsible for DBSS regulations (Song, 2017), and were thus plagued by ambiguity and the overlap of regulatory functions, and the 'buck-passing' of responsibilities between authorities (Weng, 2018). As a result, the early regulation of DBSS was inefficient and often contradictory in China (Yue and Hu, 2019). For example, in Shanghai, although the municipal government delimited prohibited parking areas for DBSS, different government agencies had different views on where bikes could legally be parked (Weng, 2018).

In August 2017, China's Central Government drafted the first national framework for DBSS regulation. It defines the responsibilities of government agencies and the obligations of operators and users, and proposes several principles to regulate DBSS. However, according to some researchers (Fan, 2018), the national guideline is imperfect and remains too focused on the macro level, while lacking practical approaches to DBSS regulation at the local level. The third issue is that a unified management standard (Fan, 2018) – and authority for local governments to regulate DBSS (Chen and Wang, 2018) – are still missing. Thus, although the Central Government guidelines were followed by the release of DBSS guidelines in many Chinese major cities (Chen, 2019), the regulation of DBSS by China's local governments has been fragmented (Li and Han, 2018). Each city – or even different districts within cities – have their own regulations, and different local regulations include different management standards and rules (Gu et al., 2019).

Outside China, DBSS enterprises tend to consult with local governments, sign a memorandum, or initiate a pilot project prior to the launch of services (Hauf and Douma, 2019). Sometimes, the major issue in cities outside China is that local governments tend to use ‘one-size-fits-all’ approaches. They either ban DBSS services (as Amsterdam, Manchester and London did in 2017), or take a tough stance towards DBSS (as Melbourne and Dallas did). In Melbourne, the local council imposed a fine of AUD \$3,000 every time a DBSS enterprise failed to take away dumped bikes within 24 hours. As a result, some enterprises such as oBike withdrew (Chen, 2019). Unfortunately, misbehaviour by users and operators still occurs frequently. The “patchwork” regulation issue in China’s cities has also been a problem in San Diego and Boston (Hauf and Douma, 2019), and in Greater Sydney (Chen, 2019), where fragmentation means DBSS regulation across local government boundaries is challenging.

#### **2.3.5 Theme 4: Cross-boundary collaboration in the governance of DBSS**

Many papers (23 of 95) discuss the role of cross-boundary governance (involving all levels of government, industry and society) in the regulation, management and operation of DBSS in Chinese cities, including first-tier cities such as Beijing, Shanghai and Guangzhou, but also provincial capitals such as Hangzhou, Wuhan and Nanjing (for the titles of papers discussed in Theme 4, see Appendix 1).

Whilst most (16 of 23) of these papers explore DBSS within these cities through the conceptual lens of ‘collaborative governance,’ other papers (7 of 23) apply different conceptual lenses, including ‘holistic governance,’ ‘intelligent governance’ and ‘social

governance.’ A key argument in these papers is that these forms of cross-boundary governance have arisen in response to the failure of top-down government models in addressing the complex interactions and relationships among DBSS stakeholders.

Most (9 of 16) of the papers addressing collaborative governance highlight how relationships between multiple stakeholders are used to address complex public concerns and realise shared goals through consultation, resource- and information-sharing, and working together to develop and implement rules (Yang and Zhu, 2019). Ma et al. (2018) refer to collaborative governance in China as ‘three-party-governance’ involving the public, private and civic sectors.

Several papers (7 of 16) discuss the responsibilities of government in the collaborative governance of DBSS. These responsibilities are described as four-fold: ‘guidance,’ ‘propaganda,’ ‘institutional innovation,’ and ‘regulation’ (Jin and Bian, 2018). Through its role in ‘propaganda,’ the government is understood to be responsible for enabling DBSS stakeholders to collaborate across their organisational boundaries to address problems and conflicts. The government is also understood to be responsible for the promotion of DBSS as a form of “green travel” and “active transport,” and for publicising the right way to use DBSS through public media (Guo et al., 2017).

The government’s ‘propaganda’ role is linked to its responsibility for the ‘regulation’ and ‘institutional innovation’ of DBSS. The government is seen as having a responsibility to clarify the responsibilities of stakeholders, and to establish collaborative frameworks, leadership structures, and communication mechanisms

governing the relationships between stakeholders (Gu and Zhang, 2019). The government is understood as being responsible for the development of ground rules and institutions (Jin and Bian, 2018), practical policies (Guo et al., 2017), collecting users' records of misbehaviour in a national individual credit reporting system (Liu and Zhang, 2018), and ensuring that DBSS are effectively integrated into, and optimise the operation of, the transportation infrastructure (Guo et al., 2017). Whilst government is understood to play a significant role in the collaborative governance of DBSS, Jiang and Cai (2017) warn that excessive intervention may inhibit the vitality and development potential of DBSS.

Many of the papers (7 of 16) discuss the responsibilities of DBSS enterprises in collaborative governance. Their responsibilities are understood to include the optimisation of the operating system, including technological innovations such as electric fences (Zhang et al., 2019) and the establishment of industry standards. A key focus of these responsibilities is to encourage the use of bikes civilly and within the bounds of specific social responsibilities.

To optimise operating systems, some papers argue that enterprises need to set up a reporting and warning system for misbehaviour, develop suitable credit rating systems (Guo et al., 2017), and establish reward and punishment mechanisms for DBSS users (Lan et al., 2017). They also argue for the need to establish blacklists for users who misuse DBSS (Jin and Bian, 2018). For example, enterprises could add a function within mobile phone app-based systems to encourage DBSS users to report misbehaviour. These systems would reward informants with credit points and deduct credit points from violators (Han and Chen, 2019), and punish users who repeatedly

violate the rules by freezing their accounts (Jin and Bian, 2018). Several papers discuss the responsibility of enterprises to establish data-sharing platforms to balance the supply and demand for bikes, reduce the vacancy rate and enhance efficiency (Jin and Bian, 2018), and also help the government monitor and manage DBSS through data-sharing (Peng et al., 2018).

Several papers (5 of 16) identify the responsibilities of DBSS users. Firstly, they argue that users have a responsibility to obey the rules, maintain ethical standards, and play a role in eliminating misbehaviour (Lan et al., 2017). For example, users are seen as being participants in the regulation process by reporting user misbehaviour through apps or phone calls. Secondly, users are encouraged to participate in volunteer programs to maintain the operation and management of DBSS, such as the “Mobike hunters” (Lan et al., 2017), who in their spare time help maintain the operation of DBSS and foster a good social atmosphere (Gu and Zhang, 2019). Finally, they argue that users should participate in decision-making by providing feedback when the government releases draft regulations (Jin and Bian, 2018).

A number of papers highlight the challenges that currently limit the effectiveness of cross-boundary collaborations in DBSS. These include:

1. Conflicts of interest and reduced levels of trust between stakeholders (Gao and Li, 2018);
2. A lack of mechanisms to support communication between stakeholders (Liu and Zhang, 2018);

3. The rigid departmentalization of responsibilities within government, and the imbalance of power between branches of government (Xie, 2018).

Whilst collaborative governance is the most-discussed concept of governance within the papers reviewed, other governance concepts are also discussed (7 of 23). Weng (2018) argues that DBSS have been enabled through the rise of “holistic governance,” which aims to address the fragmentation of administrative structures by stressing the importance of collaboration between government departments. Xu et al. (2018) argue that the management of DBSS involves a dimension of “social governance,” in which the user’s role extends beyond that of the “rational economic man” to that of an idealised human who acts rationally to maximise personal utility or satisfaction. For example, Xu et al. (2018) point out that – without any material rewards – many DBSS users in China’s cities participate in volunteer programs in their spare time to maintain the orderly parking of bikes. Volunteers within these programs have been called “bike hunters.” Finally, Li and Han (2018) argue that DBSS have been enabled through “intelligent governance,” where big-data technology is being used as an effective tool to solve DBSS governance problems by providing a monitoring platform and information sharing system which promotes the accurate distribution and regulation of DBSS fleets (Hao and Wen, 2019).

## **2.4 Discussion**

We hope that our findings will provide vital knowledge and increase awareness among DBSS researchers of trends and key themes in studies of DBSS governance. The following discussion summarises these findings and compares them with broader BSS

papers and literature reviews, and also identifies research gaps and possible directions for future study.

#### **2.4.1 Geographic distribution**

Almost all of the academic peer-reviewed papers in the sample examine the governance of DBSS within Chinese cities, with few papers discussing DBSS outside China. This contrasts significantly with the academic peer-reviewed literature that has emerged around docked BSS, which has a much greater focus on cities outside of China, such as cities in Europe (Ricci, 2015), and cities in America and Australia (Fishman, 2016). One suggested reason for this is that China is the birthplace of DBSS, and its cities have become a dominant focus of research into DBSS.

#### **2.4.2 Existing knowledge domains and evolutionary trends**

The literature review identifies four key themes. Theme 1 is the economic model, property rights and externalities on which DBSS governance was founded. It first appeared in mid-2017. Discussion of the economic model underpinning DBSS focuses on whether DBSS is part of the sharing economy or only a form of ‘pseudo-sharing.’ Discussion of property rights focuses on how DBSS has created a ‘quasi-public good’ based on the rights of bike users and ownership of bikes by DBSS enterprises. In discussions of externalities, negative impacts include the oversupply of bikes by competing enterprises, disorderly parking and the misbehaviour and ‘incivility’ of users. The positive impacts include addressing the gaps in urban transport networks and promoting the health of users. The discussion of positive externalities within the DBSS papers, particularly those surrounding health, reflect similar discussions within



the literature on docked BSS. For example, a study by Fishman et al. (2013) discusses the benefits to public health and urban liveability created by BSS. A study by Ricci (2015) similarly explores how BSS can help to reduce pollutant emissions and to improve air quality.

Theme 2, which also emerged in early 2017, is the problem of rebalancing the distribution of bikes within DBSS to address demand. Whilst the problem of rebalancing is also addressed in the broader BSS literature, the majority of this literature is focused on operator-based strategies, such as the studies by Fishman (2016) and Ricci (2015). A unique feature of the DBSS literature is the focus on both the operator-based and user-based strategies to balance the distribution of bikes.

One suggested reason for this is that rebalancing problems are more challenging in DBSS than in docked BSS because the fleets of DBSS bikes in Chinese cities are much larger and more dispersed – and thus require more rebalancing. It is inefficient and costly to depend only on operator-based strategies. Moreover, the spatio-temporal distribution features of DBSS are more flexible and complex than those of docked BSS. Therefore, DBSS needs dynamic redistribution at all times, rather than just at night. In addition, several papers discuss the accuracy of modelling techniques used to predict DBSS demand, especially regression models. RF, LSTM NNs, and ANNs are the modelling techniques most recommended by researchers. Whilst modelling is also discussed in the broader BSS literature, a unique feature of the DBSS literature is the focus on dynamic and non-linear modelling to predict bike demand.

Theme 3 is regulation by government to eliminate the negative externalities of DBSS. This theme emerged within the selected literature in mid-2017 and reflects similar discussions in the broader BSS literature, such as a study by Ricci (2015) that explores the policy implications of BSS in European cities. Whilst similarities exist within the broader literature, a unique feature of the DBSS literature is its focus on challenges, including those that local governments face as a result of either the absence of government support, or excessive government interference. The major issue for governments in regulating DBSS in Chinese cities is the high vacancy rates within government positions, the lack of policy and legal supports from higher authorities, and the confusion surrounding government agencies' responsibilities in the early stages of DBSS. Such issues arise largely because of the failure of DBSS enterprises to communicate with local governments when they launch their services.

Conversely, in cities in Australia, Europe and North America, DBSS enterprises tend to initiate dialogue with local officials, sign memoranda of collaboration, or carry out pilot programs before they launch their services. The major issue is local governments' excessively strict sanctions and rules, which often make it difficult for DBSS to survive and develop. Both inside and outside China, there is a lack of formal legal frameworks for DBSS.

Theme 4 was a shift within the DBSS literature from problem-finding and problem-defining to problem-solving. This theme did not emerge in the literature until mid-2017 and attention to it increased sharply in 2018. This shift was away from negative externalities and regulatory challenges, and towards a focus on the forms of governance being established to solve the challenges that DBSS poses. The forms of

governance discussed in papers include social governance, holistic governance and intelligent governance, but collaborative governance is the key focus. Emerging forms of collaborative governance in China are discussed as strategies to ensure the long-term sustainability of DBSS by maintaining the orderly parking and civilised use of bikes (Yao et al., 2019). Whilst the broader BSS literature emphasises the significance of multi-sector engagement (Fishman, 2016; Fishman, 2019), the strong focus of the DBSS literature on CG is unique.

### **2.4.3 Policy recommendations for DBSS**

Based on our analysis of the governance issues discussed in the 95 papers, we recommend several areas that DBSS policy should consider more closely, for cities both inside and outside China. With regard to legislation, whilst the many local governments (in China and outside China) have issued regulations since August 2017, many problems in DBSS management are not covered within the provisions of these regulations (such as industry access rules and withdrawal rules, protection of user deposits, and data-sharing).

We thus recommend filling the gaps in the extant legal frameworks around DBSS and introducing new legal provisions for specific DBSS issues. These may include aforementioned issues and detailed management policies (such as restrictions on the number of bikes released by enterprises, measures to regulate poorly run enterprises, bike parking standards, and data-sharing standards). It is not enough only to publish these regulations; what is more important is *implementing* these management policies and regulations. In China, we suggest that higher authorities empower local

government agencies, increase the legal power of local regulatory frameworks, and promote consistency in the implementation of regulations throughout the country by developing metrics for local governments to monitor compliance.

With regard to governance, we suggest that governments at all levels should establish holistic administration structures and clarify the regulatory responsibilities of local government departments to overcome their “functional fragmentation.” Local governments should be encouraged to facilitate collaborations with stakeholders for mutual benefit, including other levels of government, DBSS enterprises, users, academia, the general public, and NGOs. Such public-private-society collaborations already exist in some large Chinese cities. For example, in Guangzhou city, DBSS enterprises collaborated with sub-district offices and resident communities (property management offices) in delineating legal parking space for DBSS. These kinds of collaborations can effectively resolve parking issues (Wang et al., 2020b).

#### **2.4.4 Research gaps and future directions**

An evident strength of the literature on DBSS governance is its coverage of the problems that have resulted from the emergence of DBSS, and the forms of cross-boundary governance that have evolved to address them. However, there are several research gaps and opportunities for future research.

There are currently only a few studies on DBSS in cities outside of China. Since 2017, DBSS have been launched in cities across the world (Gu et al., 2019). More studies that focus on these cities should be encouraged. These studies could be used to

compare and understand how the property rights, economic models, externalities, regulatory systems and governance frameworks that have evolved in China differ from those that have evolved in other political, social and cultural contexts. Secondly, most of the papers in this review are from three disciplines: public management, transport, and business (with limited research from other disciplines such as law, political economy, urban planning, and information technology). A more comprehensive understanding of DBSS governance, from a greater diversity of disciplines, may help expand our understanding of DBSS in practice.

In terms of the depth of the existing research, firstly, the papers dealing with Theme 1 explain the major debates around the attributes of DBSS and their externalities. From the perspective of traditional economics, some researchers see DBSS as a quasi-public good, but others argue that DBSS can't be fully defined as a quasi-public good because exclusivity and competitiveness in DBSS are constantly shifting in response to changing spatio-temporal conditions. There is also still a lack of consensus as to the proper categorisation of DBSS within academia. This topic needs further discussion and analysis.

Secondly, the papers examining Theme 2 focus largely on traditional operator-based and static strategies, and pay little attention to the user-based strategies and dynamic approaches that are being used in DBSS rebalancing. More attention could be paid to the current and potential roles of user-based and dynamic approaches, and the challenges and opportunities these approaches bring to DBSS. Thirdly, whilst the papers dealing with Theme 3 analyse government-led regulation of DBSS, most of them do not examine the regulation frameworks in any depth. For example, they do

not systematically search for and interpret DBSS-relevant regulations and legal documents from around the world. Only a few papers discuss regulations issued by China's local governments, and these papers only focus on the regulation of DBSS within large Chinese cities. Further in-depth studies are needed of the regulatory frameworks being applied in small and medium-sized cities, along with cities outside China, to develop a more comprehensive understanding of the types of regulations being used to govern DBSS.

Finally, the depth and scope of the research into DBSS could be improved by expanding on the literature examining Theme 4. Whilst papers dealing with Theme 4 discuss the components that make up collaborative governance of DBSS, only a few of them empirically examine these components through detailed research in specific DBSS contexts. Most of the papers only explain the applicability of collaborative governance models at a partial or conceptual level. For example, Ma et al. (2018) only partly use the variables of the Integrative Framework for Collaborative Governance of Emerson et al. (2012) to discuss the governance of Shanghai's DBSS; and Gao and Li (2018) only partly use the Collaborative Governance Model (Ansell and Gash, 2008) to discuss the governance of China's DBSS. They do not explore a significant number of the variables examined in these existing analytical frameworks and models. As a result, they provide only partial insights into how these frameworks might be used to understand DBSS governance.

Moreover, most papers – and especially Chinese papers – stay at the theoretical level and lack empirical analysis of governance issues. Systematic, empirical investigations are needed that more fully apply collaborative governance frameworks to DBSS in

order to understand how the governance models within DBSS emerge and are maintained. Future research needs to address such questions as: how are collaborative governance frameworks for DBSS initiated in cities? How do the multiple stakeholders involved in DBSS participate in these processes and network with one another?

## **2.5 Conclusion and limitations**

This is the first systematic review of the burgeoning peer-reviewed literature on the governance of DBSS. It is unique in that its scope extends beyond English literature to include Chinese peer-reviewed literature, providing a broader understanding of a phenomenon that first appeared in Chinese cities in 2016, and rapidly spread to other cities around the world. The review uses thematic coding of the selected papers, supported by bibliometric analysis and knowledge mapping through the VOSviewer software, to identify four key themes within the literature on the governance of DBSS: 1) the inherent characteristics of the sharing economy and the externalities underpinning the governance of DBSS, 2) the rebalancing strategies for DBSS, 3) government regulation of DBSS and 4) cross-boundary collaboration in the governance of DBSS. The review provides insights into the evolution of these themes since 2016, and it reveals that the literature has a strong focus on the governance of DBSS in Chinese cities.

Whilst this review will help scholars, enterprise managers, and government policymakers to understand trends in the rapidly emerging field of DBSS research and practice, it is not without its limitations. Firstly, the data used in this review was collected from three databases: WoS, Scopus and the CNKI. Whilst these are

authoritative sources, some important and valuable literature may have been overlooked. Secondly, this review only focuses on peer-reviewed journal papers, and excludes grey literature, conference proceedings, and book chapters. Future reviews could examine other databases and types of documents to present a more comprehensive understanding of DBSS.

### **Declaration of competing interest**

The authors declare no conflicts of interest.

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## References

- Ansell, C. & Gash, A. (2008). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research & Theory*, 18 (4), 543-571.
- Ashqar, H.I., Elhenawy, M., Almannaa, M.H., Ghanem, A., Rakha, H.A. & House, L. (2017). Modeling bike availability in a bike-sharing system using machine learning. *5th IEEE International Conference on Models and Technologies for Intelligent Transportation Systems (MT-ITS)*, Naples, Italy, 374-378.
- Ban, S. & Hyun, K.H. (2019). Designing a User Participation-Based Bike Rebalancing Service. *Sustainability*, 11 (8), 2396.
- Caggiani, L., Camporeale, R., Ottomanelli, M. & Szeto, W.Y. (2018). A modeling framework for the dynamic management of free-floating bike-sharing systems. *Transportation Research. Part C: Emerging Technologies*, 87, 159-182.
- Chen, R. (2019). "Bike litter" and obligations of the platform operators: Lessons from China's dockless sharing bikes. *The Computer Law and Security Report*, 35 (5), 105317.
- Chen, S. & Wang, K. (2018). A study on local legislation for bicycle-sharing from the perspective of the choice of legislative model. *Journal of Ocean University of China (Social Sciences)*, 31, 103-109. [In Chinese]
- Cheng, B.H. & Qi, F.Y. (2018). Government regulation of bike-sharing: an analysis framework - based on the policy text analysis of 15 cities. *Academic Research*, 61, 62-67. [In Chinese]
- Demaio, P. (2009). Bike-sharing: History, Impacts, Models of Provision, and Future. *Journal of Public Transportation*, 12 (4), 41-56.
- Du, M.Y. & Cheng, L. (2018). Better Understanding the Characteristics and Influential Factors of Different Travel Patterns in Free-Floating Bike Sharing: Evidence from Nanjing, China. *Sustainability*, 10 (4), 1244-1244.
- Emerson, K., Nabatchi, T. & Balogh, S. (2012). An Integrative Framework for Collaborative Governance. *Journal of Public Administration Research & Theory*, 22 (1), 1-29.
- Fan, Y. (2018). The improvement of local laws and regulations on bike-sharing: a case study of normative documents in nine cities including Beijing. *Administration Reform*, 10, 52-56. [In Chinese]

- Fishman, E. (2016). Bikeshare: A Review of Recent Literature. *Transport Reviews*, 36 (1), 92-113.
- Fishman, E. (2019). *Bike Share (1st ed.)*. Oxfordshire, UK: Routledge.
- Fishman, E., Washington, S. & Haworth, N. (2013). Bike Share: A Synthesis of the Literature. *Transport Reviews*, 33 (2), 148-165.
- Gan, H.W. & Lou, C.W. (2018). Research on reversing public-private partnership in public service: taking bike-sharing service as an example. *Inner Mongolia Social Sciences*, 39, 29-35. [In Chinese]
- Gao, Q. & Li, Z.H. (2018). Analysis of the collaborative governance of bike-sharing based on SFIC model. *Science & Technology for Development*, 14, 39-43. [In Chinese]
- Gibbs, G.R. (2007). *Qualitative Research Kit: Analyzing qualitative data*. Thousand Oaks, California: Sage Publications.
- Gu, L.M. & Zhang, Y.X. (2019). Sharing bike service governance from the perspective of coproduction: A hybrid method study on the case of Shanghai. *Journal of Public Management*, 16, 89-104. [In Chinese]
- Gu, T., Kim, I. & Currie, G. (2019). To be or not to be dockless: Empirical analysis of dockless bikeshare development in China. *Transportation Research. Part A: Policy and practice*, 119, 122-147.
- Gu, Z., Zhu, Y., Zhang, Y., Zhou, W. & Chen, Y. (2019). Heuristic Bike Optimization Algorithm to Improve Usage Efficiency of the Station-Free Bike Sharing System in Shenzhen, China. *ISPRS International Journal of Geo-information*, 8 (5), 239.
- Guan, H. & Lu, S. (2019). Scheduling model of free-floating bike-sharing considering users' participation. *Journal of University of Science and Technology Beijing (Social Sciences Edition)*, 45, 1050-1056. [In Chinese]
- Guo, P., Lin, X.Z., Huang, Y., Tu, S.M., Bai, X.M., Yang, Y.W. & Ye, L. (2017). Sharing bike: Collaborative governance in Internet technology and public services. *Journal of Public Management*, 14, 1-10. [In Chinese]
- Han, Y. & Chen, L. (2019). Bicycle-sharing governance dilemma and its solution: based on CSG analysis framework. *Journal of Sichuan University of Science & Engineering (Social Sciences Edition)*, 34, 40-61. [In Chinese]

- Hao, Y.L. & Wen, Z.Q. (2019). Common construction, governing and sharing: intelligent management path of sharing bike by big data supporting. *Management Review*, 31, 249-254. [In Chinese]
- Hardin, G. (1968). The Tragedy of the Commons. *Science*, 162, 1243-1248.
- Hauf, A. & Douma, F. (2019). Governing Dockless Bike Share: Early Lessons for Nice Ride Minnesota. *Transportation Research Record*, 2673 (9), 419-429.
- He, T., Zhang, J. & Xu, H. (2019). Self-adaptive dynamic balance of shared bicycle. *Modern Electron Technology*, 42, 173–178. [In Chinese]
- Heymes, C. & Levinson, D. (2019). Stationless in Sydney: The Rise and Decline of Bikesharing in Australia. *Transport Findings*.
- Hochreiter, S. & Schmidhuber, J. (1997). Long Short-Term Memory. *Neural Computation*, 9, 1735-1780.
- Jia, L., Liu, X. & Liu, Y. (2018). Impact of Different Stakeholders of Bike-Sharing Industry on Users' Intention of Civilized Use of Bike-Sharing. *Sustainability*, 10 (5), 1437.
- Jiang, N. & Cai, J.M. (2017). How government play their roles in the sharing economy from the perspective of bike-sharing. *Hebei Academic Journal*, 37, 138-142. [In Chinese]
- Jie, T., Wei, W. & Jiang, L. (2020). A sustainability-oriented optimal allocation strategy of sharing bicycles: Evidence from ofo usage in Shanghai. *Resources, Conservation and Recycling*, 153, 104510.
- Jin, J. & Bian, S.J. (2018). The cooperative governance route of urban shared bicycle based on stakeholder perspective: A case study of Nanjing, Jiangsu province. *Urban Development Studies*, 25, 92-99.
- Lahoorpoor, B., Faroqi, H., Sadeghi-Niaraki, A. & Choi, S.-M. (2019). Spatial Cluster-Based Model for Static Rebalancing Bike Sharing Problem. *Sustainability*, 11 (1), 3205.
- Lan, J., Ma, Y., Zhu, D., Mangalagiu, D. & Thornton, F.T. (2017). Enabling Value Co-Creation in the Sharing Economy: The Case of Mobike. *Sustainability*, 9 (9), 1504.
- Leng, X.M. & Guo, S.Y. (2018). Government responsibilities in the governance of the sharing economy: Taking shared bicycles as an example. *Comparative Economic & Social Systems*, 33, 88-94. [In Chinese]

- Li, Y. & Han, C.P. (2018). Discussion on evolution of shared bikes governance. *Science & Technology for Development*, 14, 1166-1174. [In Chinese]
- Liu, R. & Zhang, X.X. (2018). The governance of negative externality of shared bikes in urban public space: Interpretation, dilemma and regulation path. *Tribune of Study*, 34, 71-76. [In Chinese]
- Liu, X. & Pan, L. (2019). A Genetic Algorithm for Solving the Bike-sharing Rebalancing Problem. *Computer Engineering*, 45, 308-313. [In Chinese]
- Ma, Y., Lan, J., Thornton, T., Mangalagiu, D. & Zhu, D.J. (2018). Challenges of collaborative governance in the sharing economy: The case of free-floating bike sharing in Shanghai. *Journal of Cleaner Production*, 197, 356-365.
- Mahmoodian, V., Zhang, Y. & Charkhgard, H. (2022). Hybrid rebalancing with dynamic hubbing for free-floating bike sharing systems. *International Journal of Transportation Science and Technology*, 11 (3), 636-652.
- Mont, O., Plepys, A., Voytenko Palgan, Y., Lehner, M., Curtis, S., Zvolska, L., Arbelaez Velez, A. M. (2020). Urban Sharing in Shanghai. *Population (city)*, 24, 281-400.
- Mateo-Babiano, I., Kumar, S. & Mejia, A. (2017). Bicycle sharing in Asia: A stakeholder perception and possible futures. *Transportation Research Procedia*, 25, 4966-4978.
- Mobike. (2017). *Mobike*. <https://www.mobike.com>. Accessed 1 January 2023.
- Nguyen Thi Hoai, T., Le Trung, T., Chu Thi Phuong, D., Nguyen, L.-T. & Ha Vu, L. (2017). Multi-source data analysis for bike sharing systems. *2017 International Conference on Advanced Technologies for Communications (ATC)*, Quy Nhon city, Vietnam, 235-240.
- Nie, Y. & Zhang, K. (2018). Cost optimization management strategy of sharing bike industry under sharing economy. 35, 8-11.
- Peng, H.T., Luo, Y.L. & Xia, D., 2018. Unusual imitation behavior and cooperative governance of sharing economy and entrepreneurship. *Studies in Science of Science*, 36, 1235-1243. [In Chinese]
- Qiu, L.-Y. & He, L.-Y. (2018). Bike Sharing and the Economy, the Environment, and Health-Related Externalities. *Sustainability*, 10 (4), 1145.

- Ricci, M. (2015). Bike sharing: A review of evidence on impacts and processes of implementation and operation. *Research in Transportation Business & Management*, 15, 28-38.
- Shi, J.-G., Si, H., Wu, G., Su, Y. & Lan, J. (2018). Critical Factors to Achieve Dockless Bike-Sharing Sustainability in China: A Stakeholder-Oriented Network Perspective. *Sustainability*, 10 (6), 2090.
- Si, H., Shi, J.-G., Wu, G., Chen, J. & Zhao, X. (2019). Mapping the bike sharing research published from 2010 to 2018: A scientometric review. *Journal of Cleaner Production*, 213, 415-427.
- Song, S.N. (2017). Research on the legal supervision of shared bicycle. *Henan Social Sciences*, 25, 67-70. [In Chinese]
- Sun, Y.Y. (2018). Sharing and Riding: How the Dockless Bike Sharing Scheme in China Shapes the City. *Urban Science*, 2 (3), 68-68.
- Wang, H., Xiong, W., Yang, L., Zhu, D. & Cheng, Z. (2020). How does public-private collaboration reinvent? A comparative analysis of urban bicycle-sharing policy diffusion in China. *Cities*, 96 (4), 102429.
- Wang, J., Huang, J. & Dunford, M. (2019). Rethinking the Utility of Public Bicycles: The Development and Challenges of Station-Less Bike Sharing in China. *Sustainability*, 11 (6), 1539-1539.
- Wang, Q. (2017). Research on the challenges and countermeasures of the development of sharing economy: From the perspective of shared bicycles. *Review of Economic Research*, 39, 37-41. [In Chinese]
- Wang, X.L. (2018). Social morality governance: Origin, operation and realization: taking the use of shared bikes as an example. *Morality and Civilization*, 37, 130-136. [In Chinese]
- Wang, Z.Y. & He, D.G. (2017). Common problems and governance paths of sharing bicycle development: Based on the perspective of product theory. *Price: Theory & Practice*, 37, 140-143. [In Chinese]
- Weng, S.H. (2018). Research on the holistic governance innovation of urban bike-sharing regulatory system. *E-Government*, 15, 21-31. [In Chinese]
- Wu, R., Liu, S. & Shi, Z. (2019). Customer Incentive Rebalancing Plan in Free-Float Bike-Sharing System with Limited Information. *Sustainability*, 11 (11), 3088.

- Xie, X.S. (2018). The theoretical reason for "failure of cooperation" in collaborative governance: From the perspective of "otherness". *Academics*, 33, 76-90. [In Chinese]
- Xu, C., Ji, J. & Liu, P. (2018). The station-free sharing bike demand forecasting with a deep learning approach and large-scale datasets. *Transportation Research Part C: Emerging Technologies*, 95, 47-60.
- Xu, J., Ma, Y. & Fan, L. (2018). Involved consumers: taking Mobike hunter as an example. *China Youth Study*, 29, 11-18. [In Chinese]
- Yang, L.H. & Zhu, D.J. (2019). The logic of governing the bicycle-sharing service: Strategies based on attributes of urban public space. *Urban Development Studies*, 26. [In Chinese]
- Yao, Y., Liu, L.W., Guo, Z.B., Liu, Z.H. & Zhou, H.Y. (2019). Experimental Study on Shared Bike Use Behavior under Bounded Rational Theory and Credit Supervision Mechanism. *Sustainability*, 11 (1), 127.
- Yi, P., Huang, F. & Peng, J. (2019). A Rebalancing Strategy for the Imbalance Problem in Bike-Sharing Systems. *Energies*, 12, 2578. [In Chinese]
- Yue, Y.J. & Hu, H.H. (2019). The research on the governance countermeasure of shared bicycles based on a multi-theoretical perspective. *Journal of Technical Economics & Management*, 40, 86-91. [In Chinese]
- Zhai, Y., Du, J. & Wu, H. (2019). Fleet Size and Rebalancing Analysis of Dockless Bike-Sharing Stations Based on Markov Chain. *ISPRS International Journal of Geo-information*, 8 (8), 334.
- Zhang, Y.P., Lin, D. & Mi, Z.F. (2019). Electric fence planning for dockless bike-sharing services. *Journal of Cleaner Production*, 206, 383-393.
- Zhao, D. & Wang, D. (2019). The Research of Tripartite Collaborative Governance on Disorderly Parking of Shared Bicycles Based on the Theory of Planned Behavior and Motivation Theories—A Case of Beijing, China. *Sustainability*, 11 (19), 5431.
- Zheng, J.H. & Li, G. (2018). The government responsibility and tools innovation for the effective governance of the negative externalities of quasi-public goods: Taking the shared bicycle as an example. *Journal of Tianjin Administration Institute*, 20, 3-10. [In Chinese]

Zhu, D.J. & She, Y.S. (2017). From possession to use: an interview with Dajian Zhu on sharing economy and sharing city. *Landscape Architecture Frontiers*, 5 (3), 32-39.

# Chapter 3: Research Design

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## Chapter preface

This chapter comprises two main parts. In the first part, I provide a methodological review of existing DBSS governance literature. The findings of the methodological review provided the basis for my research design.

In the second part, I outline the research approach used in my doctoral thesis project. I begin by clarifying my research questions and justifying the strategies I used in my research approach. Emerson's Integrative Framework for Collaborative Governance (Emerson et al., 2012) provided an analytical lens to guide my research methodology. I shall describe this framework in detail, as well as my choice of research paradigm, comparative case study approach, and methodological design.

## Paper preface

The first part of this chapter includes a re-formatted, solo-authored journal submission currently under review. The full citation for the paper is:

**Cao, J.** (currently under revision). A systematic review of the empirical research methodologies used to study the governance of dockless bike-sharing schemes (2017 to 2021). *Sustainability*.

## Statement of contribution



Jun Cao contributed the ideas contained in this paper, collected the data and wrote the manuscript.

### **Research highlights**

1. Methodological review of governance in DBSS-related journal papers between 2017 and 2021.
2. 54 journal papers written in English and Chinese were identified (with a significant contribution by Chinese researchers).
3. Over time, papers shifted focus from problem-finding and problem-defining to problem-solving.
4. Most studies use a qualitative approach and single case studies as their preferred research methodology.
5. The majority draw on document analysis, interviews and questionnaire surveys to collect data; and use descriptive analysis, statistical interpretation of parameters and thematic coding to analyse data.

# **A systematic review of the empirical research methodologies used to study the governance of dockless bike-sharing schemes (2017 to 2021)**

## **Abstract**

Since dockless bike-sharing schemes (DBSS) – an environmentally-friendly transport mode – first arose in China, the governance of these schemes at city, state and national levels has been closely examined. This study documents the empirical methodologies used in the field through a systematic review of 54 academic papers on DBSS governance (from 2017 to 2021). The results show that the number of DBSS governance-related studies has increased rapidly, and that the contribution by Chinese researchers has been significant. Most studies use a qualitative approach and single case studies as their preferred research methodology. The majority draw on document analysis, interviews and questionnaire surveys to collect data; and use descriptive analysis, statistical interpretation of parameters and thematic coding to analyse data. This review of the literature (including such factors as authors' geographical locations, number and type of respondents, time horizon, research sample size, and theoretical underpinnings) reveals that the application (and testing) of robust theoretical frameworks is still lacking in DBSS governance research. This paper not only aims to present an overview of existing research, but to guide and shape future high-quality research on DBSS governance.

## **Keywords**

systematic review; empirical studies; methodological strategies; dockless bike-sharing schemes; governance

### **3.1 Introduction**

Dockless bike-sharing schemes (DBSS), also known as free-floating bike-sharing and station-less bike-sharing (Heymes and Levinson, 2018; Ma et al., 2018; Wang et al., 2019), are the fourth generation of bike-sharing schemes (BSS) (Cao et al., 2021). Compared to earlier generations of BSS, these dockless schemes are more flexible, cheaper for users, and provide easier access to bikes (Sun, 2018). The earlier generations of BSS needed to be docked at stations, whereas DBSS provide unlocked bikes (paid for using a smartphone) that can be picked up and left anywhere at the users' convenience (Jia et al., 2018). Since 2016, private DBSS enterprises have provided DBSS services to more than 200 million users in over 200 cities in 20 countries (Cao et al., 2022).

There has been a surge in researcher interest in the operation and governance of DBSS (Guo et al., 2017), for various reasons. These schemes operate at the city-level, yet their governance is complex and usually involves a network of private and public actors from all levels of industry and government. As such, DBSS make for valuable case studies of collaborative governance and provide an opportunity for cross-cultural comparative investigations of how DBSS are managed in different cities around the world (Jiang and Cai, 2017; Weng, 2018). Since DBSS form part of the growing interlinked internet of things (Liu et al., 2019), researchers have also been drawn to studying how this kind of technology-enabled urban infrastructure works in practice.

One of the most important factors of DBSS that makes them interesting to researchers is that they are an environmentally-friendly public transport mode (Shi et al., 2018;

Cao et al., 2022; Zhang et al., 2021). They can significantly reduce energy consumption and carbon emissions caused by traffic. They have also been shown to improve public physical and mental health (Li et al., 2022). DBSS provide an effective solution to the ‘first and last mile’ travel problem for citizens (the gaps in public transport infrastructure that leave citizens stranded at the start and end of their journeys). Heydari et al. (2021) found that during the COVID-19 pandemic, DBSS usage rates increased considerably, sometimes even replacing public transit and making DBSS a reliable transportation alternative within cities.

Yet with the wrong types of governance, DBSS can also sometimes lose public support due to problems created by bike-dumping or lags in repairs of broken bikes (such as disruptions to pedestrians or traffic). This is why high-quality DBSS governance research is needed going forward: to understand some of the mistakes of the past and help policymakers, private operators, public users and other stakeholders collaborate on sustainable DBSS governance.

Recently, there has been an uptake in academic literature examining DBSS from various angles. Researchers have generally categorised the knowledge domains in these publications using a thematic and keyword analysis approach. Key themes include the contributions of DBSS to the urban built environment (Guo et al., 2022), public health and system optimisation (Fishman, 2016), factors and barriers influencing DBSS impacts and users’ behaviour (Ricci, 2015), and governance (Cao et al., 2021) associated with DBSS. A few literature reviews of the published research on BSS mainly use systematic and scientometric analysis approaches, including

mapping author networks, country and institution networks, and networks of co-citation (Si et al., 2019; Vallez et al., 2021).

While these reviews provide a useful general overview of BSS research, several research gaps become apparent in a close analysis of these studies. First, no literature review surveys the methodologies used in the growing body of empirical DBSS governance research. Second, most of the data used in previous reviews is from databases such as WoS and Scopus. In contrast, this review also incorporates search data from CNKI, making it unique within the field.

Third, the existing reviews focus exclusively on literature published in English, with no recognition or analysis of studies in other languages. This review makes a significant contribution to filling that gap by focusing on published, peer-reviewed academic journal papers on DBSS governance in both English and Chinese (from 1 January 2017 to 31 December 2021). This is especially significant given that DBSS were first launched in China (Du and Cheng, 2018). In the thematic review section of **Chapter 2**, I note that the cut-off year used in my search criteria was 2016, which was also the first year of the urban DBSS project. However, as I note in **Chapter 2**, no literature was found for 2016. In the methodological review section of **Chapter 3**, I applied the same methods and criteria that I used in the thematic review section of **Chapter 2**, and thus changed the start date/cut-off date of my search criteria from 2016 to 2017.

This review aims to address the following six main questions:

1. What is the growth trend of DBSS governance research?
2. How is empirical DBSS governance research geographically distributed?
3. How is empirical DBSS governance research distributed across disciplines?
4. What are the theoretical purposes of empirical DBSS governance research?
5. What are the methodological strategies (such as research methodology, research design, analysis and data collection methods, and theory frameworks) used in empirical DBSS governance research?
6. Why are qualitative methodological strategies most prevalent in empirical DBSS governance research?

Section 2 outlines the methodology of this literature review. Section 3 shares key findings and categorises DBSS governance studies according to factors identified in the research questions. Section 4 presents a discussion of these findings in relation to existing BSS and DBSS scholarship. Section 5 acknowledges some of the limitations of this review, identifies gaps in the research, and makes recommendations to future researchers in this field.

### **3.2 Method**

A range of data collection and analysis methods were employed to answer the five primary research questions. Relevant papers published between 1 January 2017 and 31 December 2021 were identified using three databases: CNKI, WoS and Scopus,

with a specific focus on the governance (governance OR policy OR regulation OR collaboration) of DBSS (dockless bike-sharing OR free-floating bike-sharing OR station-less bike-sharing).

Figure 3 shows a PRISMA flow diagram of the paper screening and selection process. To ensure the relevance of each publication, several selection criteria were used. First, only papers deemed empirical studies were considered for this systematic review. Second, only studies published as peer-reviewed academic journal papers were considered (which meant excluding conference papers, book chapters, editorial material, or reports). Third, only studies in either Chinese or English were surveyed. Fourth, only studies published between the above dates (January 2017 to December 2021) were included. Finally, only studies that explicitly investigate the topic of DBSS governance were incorporated (papers focused on earlier generations of bike-sharing programs were thus excluded).

In the initial database search, 353 unique papers were identified (Web of Science: 127; Scopus: 157; CNKI: 69) and duplicates were removed (n=103). These journal abstracts were subsequently screened. Stage 1 of the screening excluded articles without titles and abstracts and outside the scope of the research (n=9). Stage 2 excluded articles not related to the governance of DBSS (n=164). Stage 3 excluded articles that are not empirical studies or do not discuss research strategies and methods (n=25). This left a total of 52 papers that met the inclusion criteria.



At this stage, a snowballing survey was done on the reference lists of these 52 papers, which identified a further 1,799 articles of possible relevance. On closer examination, 2 of these additional papers were included in the systematic review, totalling 54 papers. Of these 54 papers (published between 1 January 2017 and 31 December 2021), the majority were in English (n=34, 63.0%), with the remainder in Chinese (n=20, 37.0%).

<b>Identification</b>	Records identified from:	Records removed <i>before screening</i> :
	Web of Science (n =127) Scopus (n = 157) CNKI (n = 69)	Duplicate records removed (n = 103)
<b>Screening</b>	Records screened (n = 250)	Reports excluded (n = 198):
	Reports assessed for eligibility (n = 52)	<b>Reason 1</b> (n = 9) papers that do not focus on DBSS by title and abstract <b>Reason 2</b> (n = 164) papers do not respond to the questions by full text <b>Reason 3</b> (n = 25) articles are not empirical studies, or do not discuss research methodological strategies
	Snowballing (n = 54)	1,799 full texts identified from the reference lists of the 52 texts: After closer examination, relevant additional papers identified through the snowballing process (n=2)
<b>Included</b>	Studies included in review (n = 54)	
	Reports of included studies (n = 54)	

**Figure 3** A PRISMA flow diagram showing the review procedure

The next step in this review was to apply thematic codes and sub-codes to the research content in this sample of papers. This was done by reading all of the papers in their entirety to identify passages (or images) within the text that describe the authors' methodological approaches to studying DBSS governance. Identified themes were

verified and double-checked. In keeping with the five core research questions, the selected papers were grouped according to five broad characteristics: growth trends, geographical distribution, disciplines, theoretical purpose, and methodological approaches. These groups were more closely parsed according to 10 analysis terms and several sub-codes. The full codebook and scope of analysis terms can be found in Table 4.

**Table 4** Codebook

<b>Groups</b>	<b>Analysis terms</b>	<b>Sub-codes</b>
Growth trends	Publication year	N/A
Geographical distribution	Authors' affiliation	N/A
Disciplines	Disciplines	N/A
Theoretical purpose	Purpose of empirical research	Theory building; theory verification
Methodological approaches	Methodology	Quantitative; qualitative; mixed methods
	Research design	Single case study; multiple case studies; panel study; focus group; survey
	Data collection method	Survey; interviews; observations; documentation; multiple stakeholder meetings; social media data; platform data
	Implementation	Geographical distribution; time horizon; type of respondents; sample size
	Data analysis method	Quantitative: descriptive analysis; statistical interpretation of parameters; tests of differences/similarities; measures of dimensionalities (see Table 2)

<b>Groups</b>	<b>Analysis terms</b>	<b>Sub-codes</b>
		Qualitative: thematic coding; content analysis; social network analysis; comparative history analysis; dynamic feedback
	Theoretical framework	N/A

The 5 groups and 10 analysis terms are defined as follows:

1. *Growth trends*: Publication year refers to the year the study was published in an academic journal.
2. *Geographical distribution*: Authors' affiliation refers to the institutional and geographical affiliations of authors.
3. *Disciplines*: Disciplines refers to the main research fields of the authors (please note: this review only focuses on the first listed author's research field).
4. *Theoretical purpose*: Purpose of empirical research refers to the theoretical design and goals of an empirical study, including demonstrated theory building and theory verification. Theory building means the study developed new concepts or theories based on testing a hypothesis against statistical findings or existing theories (Flynn et al., 1990). Theory verification means a theory is borrowed from another study and its validity is tested in a different situation or research field (Flynn et al., 1990).
5. *Methodology*: Methodology refers to the research approach that guides the data collection (Lincoln and Denzin, 1998; Bogdan and Biklen, 2007;

Merriam and Grenier, 2019). According to Creswell (2014), there are three research methodologies: quantitative, qualitative, and mixed methods.

6. *Research design*: Research design refers to the overall plan of action put in place to meet the stated goals of the research (Xian and Meng-Lewis, 2018). This review focuses on five types of research design used in the empirical research (Flynn et al., 1990): single case study, multiple case studies, panel study, focus study, and surveys. Some papers may use various types of research designs in tandem (Soni and Kodali, 2012).
7. *Data collection method*: This refers to how data is gathered in an empirical study, including through documentation studies, questionnaires, interviews, observations, fieldwork, etc.
8. *Implementation*: Implementation refers to how a target research population was identified and defined, which is highly varied depending on the research context (Flynn et al., 1990). This review only focuses on the geographical distribution of the research target population, the type of respondents, the time horizon of data used, and the amount of data collected from the sample population. Some of the surveyed papers depend on documentation studies, observation or focus group methods, and thus do not clarify the overall sample size. This review therefore only focuses on the sample size of any questionnaire surveys and interviews. For questionnaire surveys, this review classified the sample size of respondents into four ranges: 0-300, 300-600, 600-900, and more than 1,000. In terms of the sample size of interviews, Guest et al. (2006) suggest that for qualitative research, 15 is the smallest acceptable sample.

However, Mason (2010) suggests that if the sample size is larger than 50, the data is unmanageable. This review thus classifies the sample size of interviews into the following ranges: less than 15, 15-50, and more than 50.

9. *Data analysis*: This refers to the technique's researchers use to analyse empirical data. Qualitative data analysis methods mainly consist of thematic coding, grounded theory, and content analysis. The quantitative analysis methods most widely used in empirical research are descriptive analysis, tests of differences/similarities, statistical interpretation of parameters, and measures of dimensionalities (Montoya-Weiss and Calantone, 1994) (see Table 5).
  
10. *Theoretical framework*: This refers to the overarching framework used by the researcher to structure their ideas and theories and to connect their research to broader theoretical themes and movements within the literature. Due to space constraints, the scope of this review is restricted to examining how many of the sample papers use one or several theoretical frameworks to analyse governance issues related to DBSS (rather than discussing the details of each specific framework).

**Table 5** Quantitative data analysis techniques, adopted from Montoya-Weiss and Calantone (1994)

<b>Data analysis techniques (Quantitative data)</b>	<b>Methods</b>
Descriptive analysis	Means, frequencies, and proportions

Tests of differences/similarities	t-test, binominal test, analysis of variance (ANOVA), multiple ANOVA (MANOVA), and X <sup>2</sup> test
Statistical interpretation of parameters	Factor analysis, cluster analysis, and discriminate analysis
Measures of dimensionalities	Correlation analysis, canonical correlation analysis, regression analysis, path analysis, and structural equation models (SEMs)

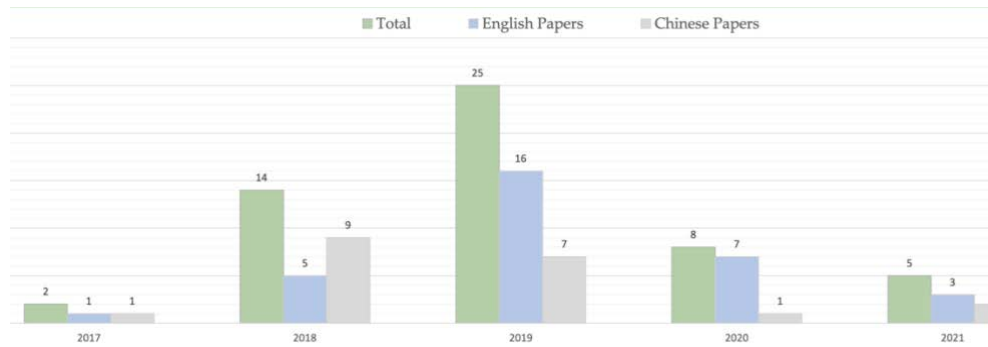
### 3.3 Results

The sample of 54 selected research papers reveals the breadth and diversity of the last five years of empirical DBSS governance research. This section shares the results of this systematic review, with findings grouped according to the five research questions. For more detailed analysis and an overview of selected papers, please see Appendix B.

#### 3.3.1 What is the growth trend of DBSS governance research?

Figure 4 shows the growth trend of the research by identifying the publication year of each selected sample paper. The largest number (n=25, 46.3%) of empirical studies was published in 2019, followed by 2018 (n=14, 25.9%), 2020 (n=8, 14.8%), 2021 (n=5, 9.3%), and 2017 (n=2, 3.7%), indicating an increase in research interest in DBSS governance between 2017 and 2019 in particular. This growth trend shows that DBSS governance is an emerging and appealing field of research. However, there has been a significant decline in the number of papers published on DBSS governance since 2020. According to Aviv-Reuven and Rosenfeld (2021), this could be because many research institutions and academic publishers are still working remotely in response to the

ongoing COVID-19 situation, which may mean time-intensive research and publishing processes have been delayed.

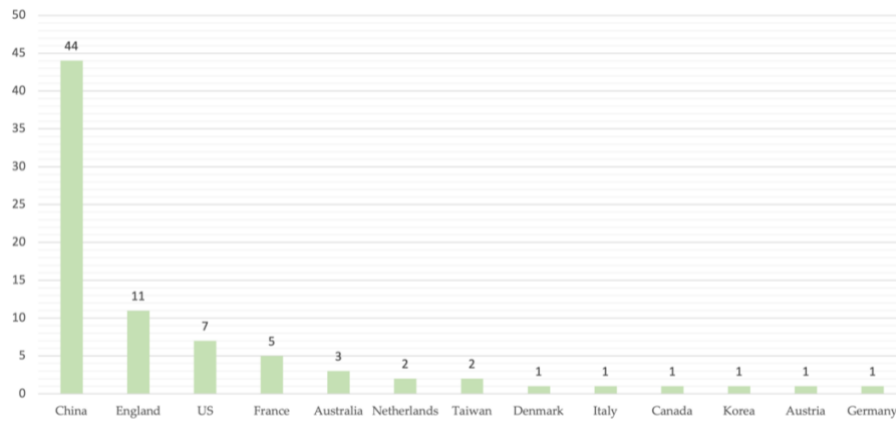


**Figure 4** The growth trend of empirical DBSS governance research

### 3.3.2 How is empirical DBSS governance research geographically distributed?

Authors of the 54 papers come from 13 countries (see Figure 5), listed here in decreasing order of magnitude in terms of author numbers: China (n=44), England (n=11), the U.S. (n=7), France (n=5), Australia (n=3), the Netherlands (n=2), Taiwan (n=2), Denmark (n=1), Italy (n=1), Canada (n=1), Korea (n=1), Austria (n=1), and Germany (n=1). This shows that Chinese researchers have made a significant contribution to the field of DBSS governance research. Furthermore, 46 of the 54 papers (85.2%) were created through cross-country institutional collaborations.

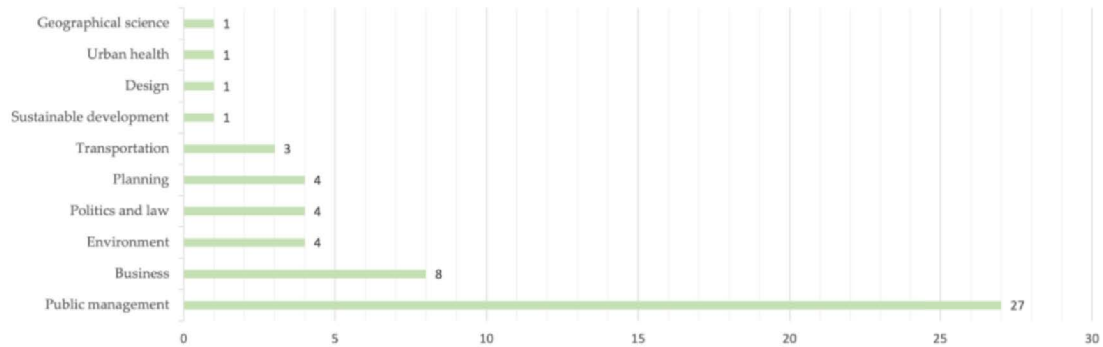




**Figure 5** The geographical distribution of authors of empirical DBSS governance research

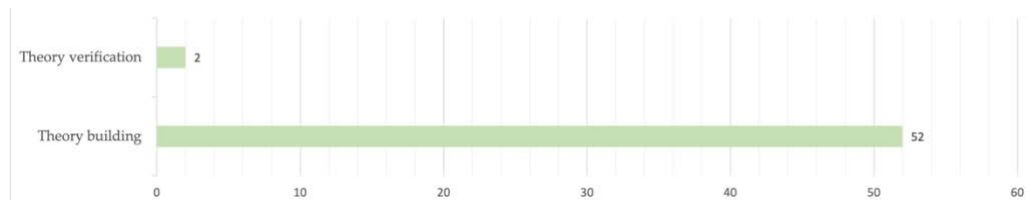
### 3.3.3 How is empirical DBSS governance research distributed across disciplines?

The papers in this sample were aligned with 10 discrete disciplines (see Figure 6): public management (n=27, 50.0%), business (n=8, 14.8%), environment (n=4, 7.4%), politics and law (n=4, 7.4%), planning (n=4, 7.4%), transportation (n=3, 5.6%), sustainable development (n=1, 1.9%), design (n=1, 1.9%), urban health (n=1, 1.9%), and geographical science (n=1, 1.9%). Notably, between 2017 and 2018, more than half of the sampled empirical studies of DBSS governance were grounded in the discipline of public management. Since 2020, attention to this topic from other disciplines has gradually increased, with authors situated in the fields of planning, sustainable development, and transportation.



**Figure 6** The distribution of disciplines in empirical DBSS governance research

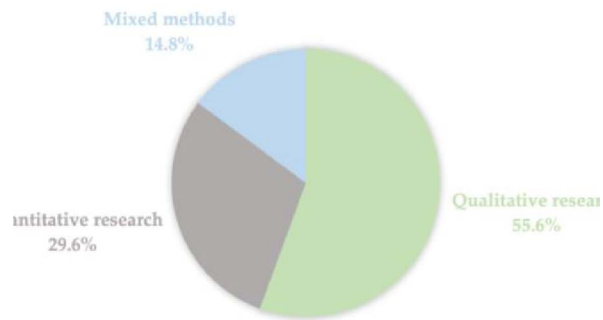
Figure 7 shows that existing empirical studies of DBSS governance are more inclined towards theory building (n=52, 96.3%) than theory verification (n=2, 3.7%). This is likely attributed to the fact that DBSS governance research is still in its infancy, which means that researchers are breaking new ground theoretically.



**Figure 7** The theoretical purpose of empirical DBSS governance research

### 3.3.4 The selection of methodology

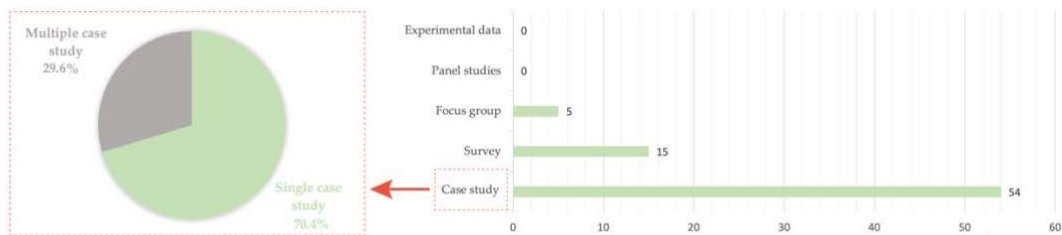
Figure 8 reveals that in the literature sample, qualitative research (n=30, 55.6%) is preferred to quantitative research (n=16, 29.6%), while research adopting a mixed methods approach accounts for only 14.8% (n=8) of the total. The interest in qualitative and quantitative studies increased throughout the five-year time range of this review, matched by a steep decrease in mixed methods studies.



**Figure 8** Research methodologies used in empirical DBSS governance research

### 3.3.5 Research design

Figure 9 shows the wide variety of research design in the review sample. Most popular are case studies (n=54, 100%), followed by surveys (n=15, 30.0%) and focus groups (n=5, 9.3%). Notably, no papers incorporated panel studies or experimental data. Of the papers using case studies, 38 (70.4%) were based on a single case study, and only 16 (29.6%) used multiple case studies. According to the data, 20 (37.0%) of the 54 papers used a combination of two research strategies.



**Figure 9** Research design used in empirical DBSS governance research

### 3.3.6 Data collection methods

Figure 10 shows that – in this literature sample – the most frequently used data collection method was document analysis (n=28, 51.9%), followed by interviews (n=24, 44.4%) and questionnaire surveys (n=21, 38.9%). The following methods were

used much less frequently: observations (n=9, 16.7%), multiple stakeholder meetings (n=6, 11.1%), platform data (n=4, 7.4%), and social media data (n=3, 5.6%). Further analysis reveals that, of the papers using questionnaire surveys (n=21), these were mainly distributed online (n=12, 57.1%), while 8 (38.1%) were distributed via both online and face-to-face methods. Only 1 paper (4.8%) reported distributing questionnaires solely face-to-face. More than half the sample studies used 1 (n=31, 57.4%) data collection method, while several studies adopted 2 (n=10, 18.5%) or 3 (n=8, 14.8%) data collection methods. Only 5 studies (9.3%) used more than 3 data collection methods.

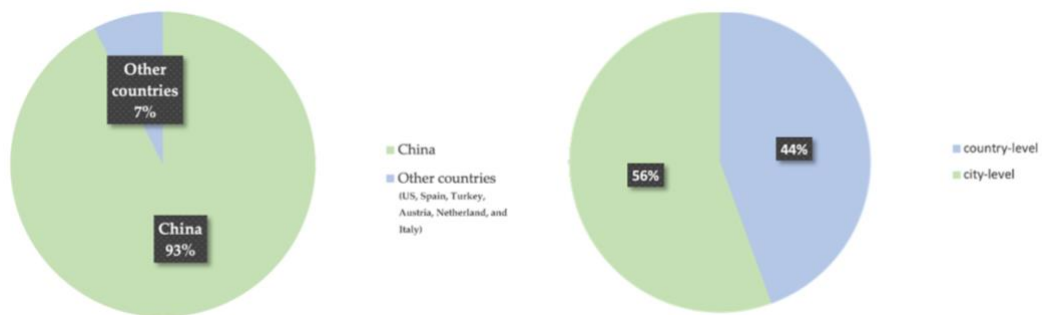


**Figure 10** Data collection methods used in empirical DBSS governance research

### 3.3.7 The implementation and range of collected data

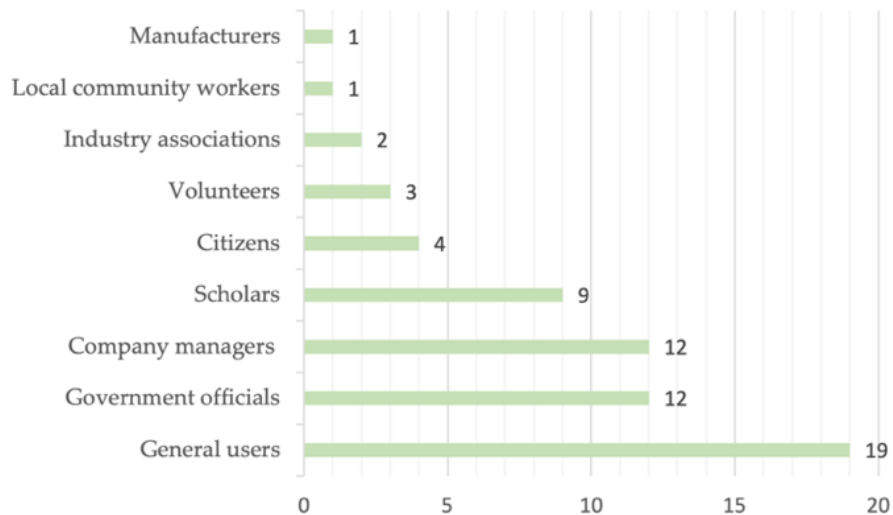
In terms of the geographical distribution of the sample populations from whom data was collected, 50 studies (92.6%) collected data from China. Only 4 papers (7.4%) collected data from the U.S., Spain, Turkey, Austria, the Netherlands or Italy (see Figure 11). Most studies focused on data collected at the city level (n=30, 55.6%), but a substantial number of studies still collected data at the country level (n=24, 44.4%). Of the 30 city-level studies, 60.0% (n=18) focused on data collected from a single city, with fewer papers considering data from multiple cities (n=12, 40.0%). The findings also reveal that Shanghai is the most-favoured city in the world for researchers to

collect data, followed by other Chinese cities like Beijing, Hangzhou and Shenzhen. Of the 24 country-level studies, 22 (91.7%) collected data from a single country, and only 2 (8.3%) collected data from multiple countries (see Figure 11).



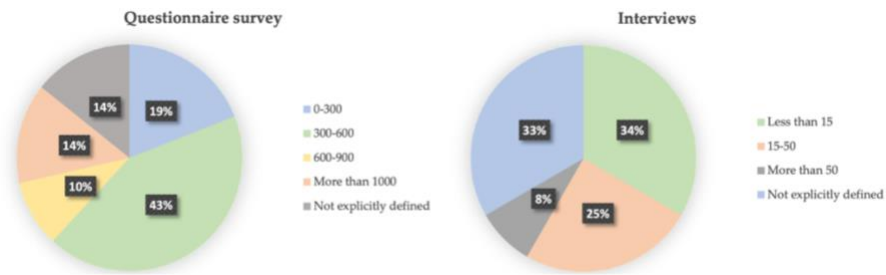
**Figure 11** The geographical distribution of collected data

In terms of the types of respondents, this review can only answer this question in relation to studies (n=35) using interview and survey methods (see Figure 12) because 20.0% (n=7) of the sampled papers did not specifically identify the type of respondents. In the remaining 28 papers, researchers slightly preferred to collect data from multiple types of respondents (n=15, 53.6%) than from a single type of respondent (n=13, 46.4%). The largest share of empirical studies collected data from general users (n=19, 67.9%), followed by government officials (n=12, 42.9%), enterprise managers (n=12, 42.9%), scholars (n=9, 32.1%), citizens (n=4, 14.3%), and volunteers (n=3, 10.7%). Little consideration was given to industry associations (n=2, 7.1%), local community workers (n=1, 3.6%), or manufacturers (n=1, 3.6%).



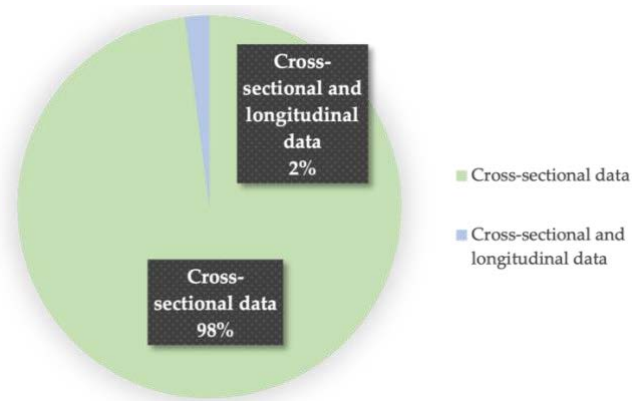
**Figure 12** The type of respondents selected by DBSS governance researchers

As previously noted, in terms of measuring sample sizes, this review only focuses on 35 studies within the sample that used questionnaire surveys (n=21) or interviews (n=24) (see Figure 13). Of those using questionnaire surveys, 3 papers (14.3%) did not report the research population sample size. The largest sample size range group for questionnaire surveys was 300-600 (n=9, 50.0%), followed by 0-300 (n=4, 22.2%), more than 1,000 (n=3, 16.7%), and 600-900 (n=2, 11.1%). With regards to the sample size of interviewees, 8 papers (33.3%) did not report the sample size. Most of the studies used an interviewee sample size of less than 15 (n=8, 50.0%), followed by 15-50 (n=6, 37.5%), and more than 50 (n=2, 12.5%). This shows that 10 out of 16 papers (62.5%) used samples that were either undersized (fewer than 15 interviewees) or oversized (more than 50 interviewees).



**Figure 13** The questionnaire and interviewee sample sizes used in empirical DBSS governance research

As for the time horizon of data in the sample literature (see Figure 14), 5 papers (9.3%) did not specifically mention this factor. Of the remaining 49 papers, the time horizon of the data collected for most studies was defined as cross-sectional (n=48, 98.0%). Only 1 study (2.0%) used a combination of longitudinal data and cross-sectional data.

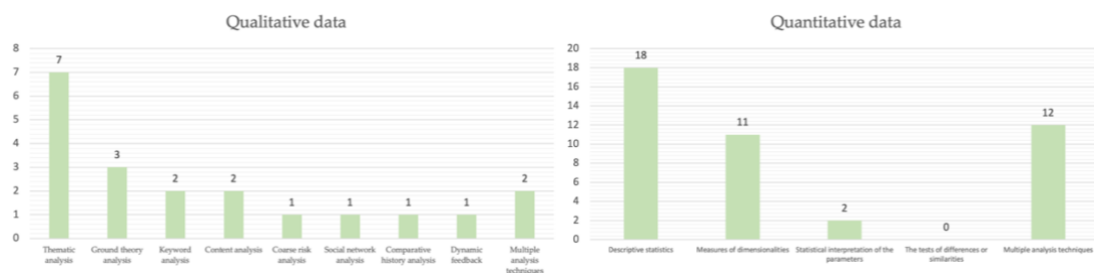


**Figure 14** The time horizon of data used in empirical DBSS governance research

### 3.3.8 Data analysis methods

Within the selected sample, 38 (70.4%) of the 54 studies include qualitative data, and 23 (42.6%) of the 54 studies include quantitative data. Of the studies using qualitative data, only 18 (47.4%) explain how their data was analysed. Figure 15 shows that most of these papers used thematic analysis (n=7, 38.9%), followed by grounded theory

analysis (n=3, 16.7%), keyword analysis (n=2, 11.1%), and content analysis (n=2, 11.1%). The lesser-used methods include coarse risk analysis (n=1, 5.6%), social network analysis (n=1, 5.6%), comparative history analysis (n=1, 5.6%), and dynamic feedback (n=1, 5.6%). Only 2 of 18 qualitative studies (11.1%) used a combination of multiple data analysis techniques. Of the studies (n=23) dealing with quantitative data, almost all papers (n=22, 95.7%) clearly explain how the data was analysed. Most of these papers adopted a descriptive statistics approach (n=18, 81.8%), followed by measures of dimensionalities (n=11, 50.0%), and only 2 (9.1%) papers used statistical interpretations of the parameters. None of the studies employed an approach based on tests of differences or similarities. 12 of 22 papers (54.5%) used multiple data analysis techniques.



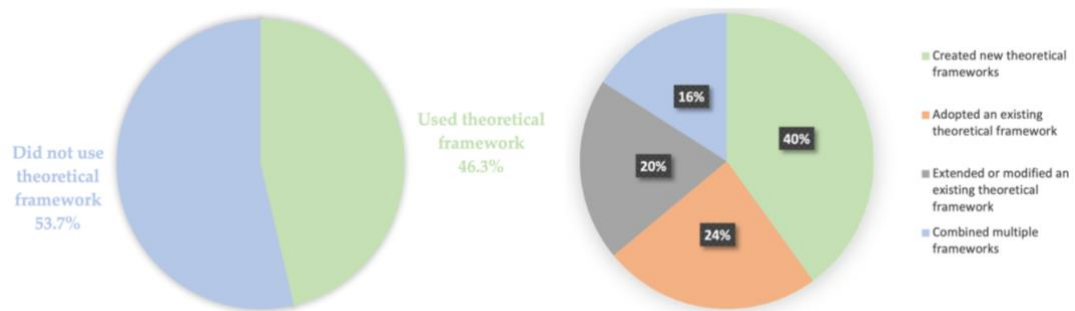
**Figure 15** Data analysis methods used in empirical DBSS governance research

### 3.3.9 The application of theoretical frameworks

Only 25 of 54 papers (46.3%) within the sample adopted a theoretical framework in analysing DBSS governance issues. Most papers (n=29, 53.7%) used no theoretical framework. The most prevalent approach researchers took was creating new theoretical frameworks (n=10, 40.0%). Slightly fewer adopted an existing theoretical framework (n=6, 24.0%), extended or modified an existing theoretical framework (n=5, 20.0%), or combined multiple frameworks (n=4, 16.0%) (see Figure 16). Of all



the theoretical frameworks used, only the Theory of Planned Behaviour Framework was used in more than one paper. This shows that no common theoretical framework is widely used for DBSS governance research.



**Figure 16** The application of theoretical frameworks in empirical DBSS governance research

### 3.3.10 Why are qualitative methodological strategies most prevalent in empirical DBSS governance research?

As for why DBSS researchers prefer to examine the governance issues of DBSS from a qualitative perspective, some of them have given explanations. Neuman and Robson (2017) indicated, qualitative methodologies leave the data in diverse and non-standard forms, but quantitative methodologies are only used to convert observations into standard measures such numbers. Undoubtedly, the CG of DBSS is a complex and diverse system, and to reach the research aim, and to understand their diverse experiences and behaviors within specific urban contexts, any researcher who is investigating this topic needs to have in-depth dialogues with key actors (e.g., governments, DBSS companies and users) who have been involved in the CG of DBSS (Cao et al, 2022). A qualitative methodology thus is the most suitable option for this study of the collaborative dynamics and interactive processes of the governance of

DBSS (Liu, 2017), because the complexity of DBSS CG is hard to explain by numbers or standard answers (Gu and Zhang, 2019).

### **3.4 Discussion of findings**

This systematic review of 54 empirical DBSS governance studies (published in English or Chinese between 2017 and 2021) reveals a wide range of research methodologies, approaches, and wider trends within the field. This was achieved by analysing and comparing key metrics in these papers, such as year of publication, authors' affiliations, disciplines, theoretical purpose, and methodologies.

The following discussion summarises and contextualises these findings concerning broader bike-sharing and sharing economy research. The review findings can provide useful information and valuable guidance to researchers in this growing field, while also identifying research gaps and future implications of these results for further research.

A key insight shared in this review is the rapid growth in empirical studies within the field of DBSS governance between 2017 and 2019 (when most of the papers surveyed were published). This outcome confirms the findings of Zhou et al. (2022), who identified 2019 as the year in which publications within the bike-sharing research field peaked, as well as those of Van Waes et al. (2020), who also noted that research on DBSS governance increased significantly around 2019.

Although most papers surveyed were published in English, most were written by Chinese authors at Chinese research institutes or universities. This finding is consistent with other research (Cao et al., 2021; Zhou et al., 2022) that has acknowledged Chinese researchers' major contribution to the field of DBSS governance. Furthermore, this review shows that most of the selected studies were carried out by a close, collaborative international network of researchers. This finding corresponds with that of Zhou et al. (2022), who write that – since 2019 – DBSS governance research has become more and more co-operative, bringing together academics from various institutions worldwide.

However, Si et al. (2019)'s research does not support the above claim: the authors found that cross-country institutional collaboration needs to be improved in DBSS governance research. This difference in the research findings is partly explained by the limited scope of the latter study (which only covered papers up to 2018). It is true that, in the early stages of DBSS governance research, the global co-operative research collaborations among DBSS research institutions had not yet had the time or opportunity to develop (Zhou et al., 2022).

This review of the relevant literature reveals that most empirical studies of DBSS governance in the defined time frame (2017 to 2021) were conducted from within the discipline of public management. Although some researchers from other disciplines (such as urban planning and sustainable development) have begun to pay attention to DBSS governance since 2020, research on this topic in disciplines other than public administration is still relatively rare. This finding is supported by Cao et al. (2021), who note that DBSS governance is one of the most prevalent topics in public

management, business and policy research. Yet it also suggests that more work is needed to invite researchers in other disciplines to study DBSS governance from different perspectives – echoing Lan et al. (2017)'s call to expand the range of disciplinary approaches to DBSS governance, so that it does not remain the domain only of public management researchers.

Linked to the fact that the field of DBSS governance studies is relatively new and still emerging (as is research on the sharing economy or bike-sharing in general), this review shows that the number of papers that engage in theory building is far higher than those that carry out theory verification. This is consistent with commentary by Liu et al. (2019), who note that most DBSS governance research is still in a phase of concept development and testing, and is focused on trying to build new theories to make sense of the innovative public-private collaborative forms of governance that often characterise DBSS around the world. This is exciting because it is a creative and productive time for researchers. Still, it also signals that – as the field matures – there will be a need for consensus-building and communally accepted theoretical frameworks to help researchers understand and evaluate DBSS governance.

In terms of the methodological choices of researchers, this review found that qualitative methods are preferred in empirical DBSS governance research. This corresponds with Gu and Zhang (2019)'s finding that qualitative methodologies dominate the DBSS research field. However, this review does not support Gu and Zhang (2019)'s claim that quantitative methodologies are still severely lacking in research on DBSS governance, as this review found that more than a quarter of the research on DBSS governance is based on quantitative methodologies.

The review findings presented here do correspond with those from a literature review by Rojanakit et al. (2022) of broader sharing economy research: they found that a mixed method approach (combining qualitative and quantitative methods) was least represented. This is similarly the case in DBSS governance studies, and suggests that researchers in this field could innovate by finding productive ways to combine these methodologies in future research.

As for research design, this review reveals that most papers surveyed are grounded in a case study approach, with single (rather than multiple) case studies being the most common. This insight is unique to this review, as it has not been reported in prior DBSS governance-related research. Interestingly, the sharing economy literature review by Rojanakit et al. (2022) encouraged researchers to conduct more case studies, which the authors said would help to test, challenge and enhance the validity of broader theoretical frameworks.

Focus groups, according to the data, are not a common research design choice for DBSS governance researchers (as this review shows). This finding is consistent with that of Agarwal and Steinmetz (2019), who report that only 5% of empirical DBSS governance research uses focus groups. Compared with individual interviews, focus groups are useful to explore collective perspectives, attitudes, behaviours, and experiences, and thus can yield rich, in-depth data. They are also useful to a researcher in illuminating agreements, disagreements and inconsistencies within and between different actor groups (Gill and Baillie, 2018). However, due to the complex practical

realities of DBSS governance – which involves multiple stakeholders, including government officials, enterprise managers and public users (Cao et al., 2022) – it can be difficult for researchers to persuade actors from different sectors to come together for group discussions and focus groups (and also to gain permission and consent to record these conversations for research purposes).

This paper is also the first to recognise that document analysis is among the most prevalent data collection methods DBSS governance researchers use. This finding can be explained by how these researchers tend to be embedded in specific social, cultural, and political contexts (Qiao, 2016), and thus may privilege document analysis as a means of identifying and interpreting local and national DBSS policies and regulations.

The review findings support other research (Agarwal and Steinmetz, 2019; Mody et al., 2021) showing that interviews and questionnaire surveys are the other two major data collection methods researchers use within the sharing economy field. Much of the DBSS governance research surveyed here uses only one data collection method (rather than several). This finding supports the research outcome of Mody et al. (2021), who found that only a few DBSS studies used mixed data collection methods, a statistic that has yet to increase in proportion to the broader research on the sharing economy. This means that future DBSS researchers need to fully leverage the breadth of insights that different data types can provide.

Another interesting finding of this review is that almost all survey-based studies distributed questionnaires online (as opposed to pen-and-paper or face-to-face approaches). This finding corresponds with that of Mody et al. (2021), who found that, in sharing economy research, the number of studies using face-to-face questionnaires was one-sixth the number of studies using online surveys. The explanation for this trend is fairly obviously linked to the widespread use of Internet-enabled technologies, which makes conducting questionnaires online more efficient and less costly. It also gives respondents higher confidence that their answers will remain anonymous, and reduces barriers to their involvement in research, such as social anxiety or not answering honestly due to a need to save face publicly (Joinson, 1999; Fox et al., 2003).

The majority of the papers surveyed in this review collected and analysed data from China. This finding is consistent with observations by Han (2020), who notes that the majority of DBSS governance papers focus on data collected in Chinese cities. Zhou et al. (2022) similarly show in their literature review that China is the focus of the largest number of papers in the sharing economy field (a total of 248, or 39%). One reason for this is that China is the birthplace of DBSS, and it hosts the largest number of DBSS fleets (Han and Chen, 2019). These well-developed and established DBSS programs thus provide researchers with a wealth of data (Zhou et al., 2022).

In terms of the type of respondents, this review is the first to show that most DBSS governance researchers selected DBSS users as their target respondents, followed by government officials, and enterprise staff. This finding thus contributes a more finely-grained analysis to the observations of other researchers (Jin and Bian, 2018; Weng,

2018; Cao et al., 2022) who have identified the three general groups of target respondents (government officials, DBSS enterprise representatives, and DBSS users).

On the time horizon, this review shows that cross-sectional data is the preferred type of data used in empirical DBSS governance studies, an insight that has yet to be reported elsewhere. This can be explained by reference to the work of Rindfleisch et al. (2008), who note that collecting longitudinal data is a time-consuming and costly process, and thus often avoided in empirical research.

Regarding research sample sizes, these should be calculated based on the population size, margin of error, confidence level and expected variance. Many studies (Combs and Onwuegbuzie, 2010; Mason, 2010) have put forward general rules to guide sample selection. This review is informed by Combs and Onwuegbuzie (2010), who state that an acceptable sample size in survey-based studies should be 300 maximum to provide an acceptable margin of error and fall before the point of diminishing returns. The review findings show that almost all the survey-based studies collected data from an appropriate sample size of respondents. However, most of the interview-based studies were found to have sample sizes that were too small or large according to accepted sample size guidelines.

Of the papers that used quantitative data analysis methods, the most common were descriptive analysis and measures of dimensionalities, particularly regression analysis and SEMs. This finding is consistent with Mody et al. (2021), who note that



quantitative studies in the sharing economy field rely heavily on regression and SEMs to analyse consumer behaviour.

Of those that use qualitative data analysis methods, the review findings support those of Mody et al. (2021) and Rojanakit et al. (2022), who show that qualitative studies in the sharing economy field primarily use content and thematic analysis, and grounded theory. Elsewhere, Lan (2019) holds a different view, claiming that no observably dominant methods have emerged in qualitative sharing economy research (which they believe is the result of the field still being so new).

Regarding the theory used in the surveyed literature, this review indicates that only a few of the papers adopt a theoretical framework as an analytical tool to analyse DBSS governance issues. This finding confirms the observation by Liu (2020) that the literature on DBSS governance mainly consists of brief, descriptive analysis and that too much of it lacks robust theoretical underpinnings. This can negatively affect the credibility of the research results, a problem discussed in more detail in the next section.

The reasons why DBSS researchers tend to choose qualitative strategies to explore the CG of DBSS have been analysed in the results section. Our data shows that many DBSS researchers believe that the CG of DBSS is a complex process which includes diverse behaviours of different actors, qualitative methodological strategies are valuable not only for DBSS researchers to understanding diverse experiences and behaviours of different actors within specific contexts, but also allowed researchers

to engage in in-depth dialogue with key actors. This is why the qualitative strategy is more suitable to analyze the CG issue of DBSS. Although, this result has not been mentioned in any previous literature reviews on the governance of DBSS and other urban sharing economy, it is consistent with some research of other governance fields. For example, in Pham (2016)'s university governance research, she stressed that the qualitative methodology is the most effective way to explore CG issues that enables researchers to address the collaboration and governance issues through their own interpretation of the meaning of CG phenomena from the actors' perspectives in specific contexts. Similarly, in Kim (2010)'s urban governance research, he argued that to examine the CG issues needs an understanding of contemporary phenomena and real-life events in reveal the meaning of collaboration and associated factors that promote or hinder the collaborative process, qualitative methodology was the most suitable approach.

### **3.5 Acknowledgement of limitations and recommendations for future research**

This literature review has revealed some significant gaps in the existing research on DBSS governance. In this section, the implications of these results for future research will be outlined, in the hope that researchers can use this review as a guide to fill those gaps and design high-quality, innovative research into DBSS governance worldwide.

#### **3.5.1 Acknowledgement of the limitations of this review**

Several limitations constrained this study. First, regarding research scope, this review only covers articles on the governance of DBSS and did not examine the literature on broader topics within the DBSS research field. Second, regarding research method, the

data used in this review was collected only from WoS, CNKI and Scopus. While these databases are considered the most authoritative data sources for this particular topic, some valuable literature held in other databases (that focus on the economy, public policy, or security) may have been overlooked.

Third, the literature surveyed in this review consists of published peer-reviewed journal papers. Other useful sources – such as grey literature, conference proceedings, or book chapters – were not included, though they would contribute different layers of insight. Future reviews should extend beyond these limitations to consider other types of databases and a more comprehensive array of literature.

### **3.5.2 Theoretical recommendations**

Theory verification (as opposed to theory building) is known to mark the maturity of a discipline (Soni and Kodali, 2012; Naga and Kodali, 2014). Although DBSS researchers and practitioners have a strong interest in developing new theories and concepts to describe, understand and analyse the governance dilemmas faced by DBSS worldwide, it might be time for a shift. A research field reaches maturity only if the share of theory building and theory verification are equal, or once theory verification overtakes theory building (Soni and Kodali, 2012). This review emphasises that DBSS governance researchers should strike the right balance between theory building and theory verification in future.

A related recommendation to researchers is to apply existing theoretical frameworks in their empirical DBSS governance research. Researchers should be encouraged to

apply an appropriate theoretical framework that specifically helps to analyse on-the-ground, practical DBSS governance issues. This will allow for the creative testing, challenging and extension of theoretical frameworks within grounded empirical DBSS governance research.

### **3.5.3 Methodological recommendations**

As already noted, very few of the DBSS governance papers surveyed use mixed methods. Since both qualitative and quantitative research methods have acknowledged limitations (Naga and Kodali, 2014), a combination of the two can be an efficient way of triangulating data, overcoming potential bias, and avoiding the pitfalls of research that is too narrowly associated with the use of a single methodology (Hussey and Hussey, 1997; Johnson and Christensen, 2014). This review recommends that researchers actively combine qualitative and quantitative methods in future DBSS governance research to achieve more meaningful results.

A further recommendation to researchers is to expand beyond the current dependence on single case studies, and look at DBSS governance beyond Chinese urban contexts. DBSS have been launched in more than 20 countries, and the development conditions of DBSS in different cities, regions and countries are highly diverse and context-specific (Cao et al., 2021). However, to date, most research has only drawn on data from Chinese DBSS. There is a real opportunity for researchers to understand DBSS governance comparatively across these varied cultural and geographical contexts, and to test established theoretical frameworks in other localities (Qiao, 2016). Comparative

case studies of DBSS governance in multiple cities worldwide will radically improve the resilience and adaptability of any conceptual model.

In addition to the three dominant DBSS stakeholder groups (government officials, enterprises, and users), there are many other important participants and actors involved in the governance of DBSS, including scholars, policy experts, university think tanks, volunteer groups, industry associations, and street and community organisations (Jin and Bian, 2018; Weng, 2018). DBSS researchers should pay attention to these respondents to paint a more comprehensive and detailed picture of DBSS governance in practice and theory. Any future interview-based studies should also target an appropriate but manageable sample size of respondents.

As previously discussed, almost all of the papers in this literature review use cross-sectional data. However, the governance arrangements of various DBSS are constantly changing and evolving (Emerson and Nabatchi, 2015), and attention to this kind of longitudinal data will allow researchers to track the evolution of DBSS governance over time, as well as any changes in stakeholders' experiences or attitudes (Naga and Kodali, 2014). These kinds of longitudinal qualitative studies are also needed in future to build a better understanding of the long-term environmental and health impacts of DBSS.

There is also an identified need for higher-quality research reporting. Many authors of the surveyed studies did not provide a complete or accurate description of their research methodologies (see the high number of “not explicitly defined” tags in

Appendix B). Without a reliable description of the methodologies used in these studies, readers cannot properly assess their quality or replicate their research design or methods (Hong and Pluye, 2019).

Finally, it is important to find ways to encourage other scholarly disciplines (beyond public management) to get involved in future DBSS governance research. While there are promising signs that researchers from different disciplines (such as economics, law, and sustainable development) have begun to pay attention to DBSS research in recent years, empirical research on DBSS governance in disciplines other than public administration or management is still relatively rare. This review warmly encourages researchers in as many fields as possible to design studies of DBSS governance, recognising the meaningful contribution DBSS can make to the environmental and social health of cities everywhere in the world. For example, economists can try to develop a more accurate definition of the economic attributes of DBSS, which are still debated. Researchers in the field of law can think through how to provide legal and policy support for DBSS. Researchers in the field of sustainable development can further consider the role of DBSS in promoting or hindering urban sustainable development (as most related research has thus far focused only on the environmental benefits of DBSS).

### **3.6 Research Design**

The methodological review section summarises the methodological strategies that tend to be used in this research field, and notes several limitations in using those strategies within the DBSS governance research field. Building on research methodologies

developed in some of my prior research into the governance of DBSS, I position myself as a constructivist researcher. This thesis adopts a qualitative research design and uses Emerson et al. (2012)'s Integrative Framework for Collaborative Governance as an analytical lens. The remaining part of this chapter details my overarching research methodology, data collection methods, data analysis techniques, and some points about data validity and reliability. I'll conclude by discussing the ethical considerations and protocols followed in my research. Table 6 provides an overview of my research framework.

**Table 6** Research framework

<b>Paradigm</b>		Interpretivism		
<b>Theoretical framework</b>		Integrative Framework for Collaborative Governance (Emerson et al., 2012)		
<b>Methodology</b>		Qualitative		
<b>Phase 1</b>	<b>Approach</b>	Literature review		
	<b>Methods</b>	Systematic review; knowledge-mapping		
<b>Phase 2</b>	<b>Approach</b>	Comparative case studies (multi-nation)		
	<b>Methods</b>	<b>Desktop research</b>	Documentary analysis	Legislation; by-laws and policy texts; enterprise strategies, development plans; announcements; reports; statistical data; news on local events; official websites
		<b>Field research</b>	In-depth, semi-structured interviews	In-depth semi-structured interviews with key respondents from government, DBSS enterprises, and academia.

			Focus group discussions	Observations of major multi-stakeholder meetings between government departments, DBSS enterprises, and academics.
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### **3.7 Using the Integrative Framework for Collaborative Governance as an analytical lens**

In keeping with the aims of my research, I selected an analytical framework as a tool and foundation to explore, compare and contrast the different CG modes used to govern DBSS in different contexts. The Integrative Framework for Collaborative Governance (Emerson et al., 2012) is a powerful theoretical tool for these purposes. I have used it in my research as an analytical lens to understand the complex processes of CG of DBSS.

Emerson et al. (2012)'s Integrative Framework for Collaborative Governance is a pioneering analytical tool for anybody studying collaborative governance. It establishes a broad conceptual approach to situating and exploring the various components of CG systems, ranging from policy- or program-based inter-governmental collaboration, to locality-based regional collaboration with non-governmental actors, to public-private partnerships (Ma et al., 2018).

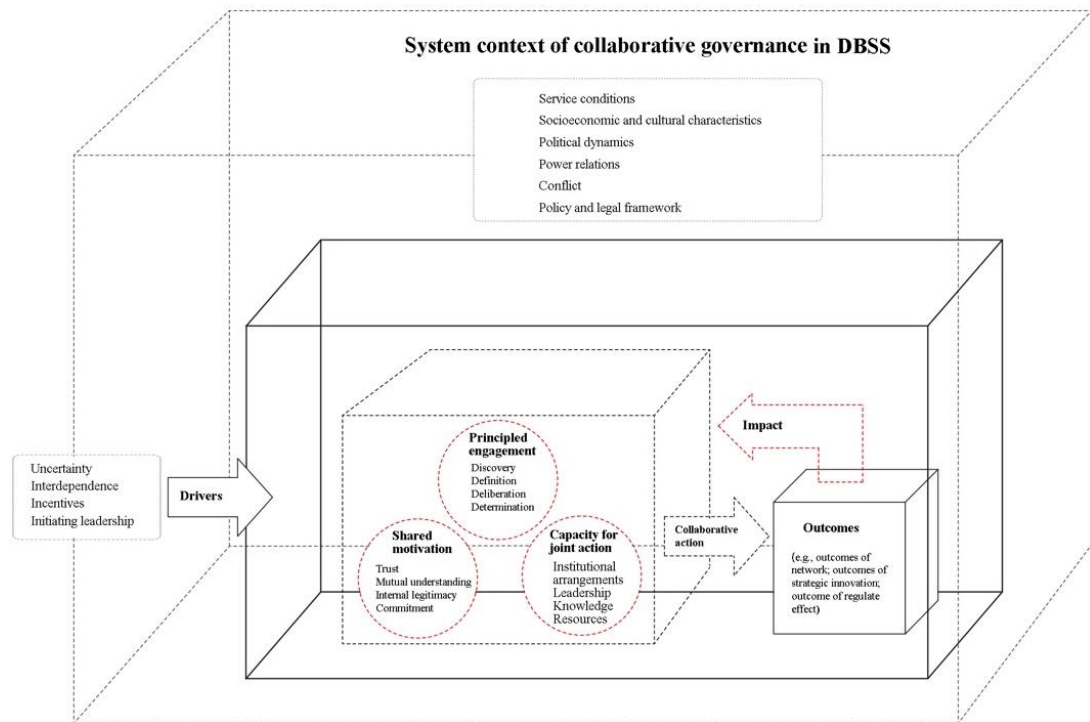
The Integrative Framework for Collaborative Governance was informed by broader CG theory and practice. It combines existing theoretical frameworks, mapping cross-sectoral collaboration and broadening the analytical scope of CG in general. Compared



to other existing frameworks for CG (Selin and Chevez, 1995; Bryson et al., 2006; Ansell and Gash, 2008; Koschmann et al., 2012), the Integrative Framework for Collaborative Governance includes and pays attention to more variables, including system contexts, drivers, collaborative dynamics, and outcomes.

It thus creates a more comprehensive picture of the many factors that influence CG, helping researchers to describe and explain the mechanisms that shape CG across multiple disciplines. Furthermore, the Integrative Framework for Collaborative Governance views the process of CG as cyclical and iterative. This makes it especially suitable for understanding the CG of sharing economies (including dockless bike-share schemes), which are complex and subject to many changes over time (Emerson and Nabatchi, 2015).

The Integrative Framework for Collaborative Governance (Emerson et al., 2012) is thus highly compatible with my primary research questions. The framework has allowed me to examine a range of CG variables, including system context (such as policy and legal frameworks, social and cultural characteristics, and power relations), to understand how contextual factors affect the CG process. The framework also delineates collaborative dynamics (such as principled engagement, shared motivation, and capacity for joint action) to understand the nature of interactions between key actors, and the essential ingredients for effective collaboration (Emerson and Nabatchi, 2015).



**Figure 17** Integrative Framework for Collaborative Governance applied to urban dockless bike-share schemes (DBSS) Source: By author, adapted from Emerson and Nabatchi (2015)

The Integrative Framework for Collaborative Governance, as adapted in Figure 1, maps out system context, drivers, collaboration dynamics, actions, outcomes, and adaptations. The outermost structure in the diagram represents the surrounding context that influences the formation, collaborative processes, and outcomes of CG of DBSS in any global city.

According to the framework (and as depicted in Figure 17), there are four drivers for various actors to initiate a collaborative governance regime for DBSS. At least one driver must be present, or it is unlikely that a CG regime can be launched. The presence of multiple drivers can increase the chances of initiating a sustainable CG regime.

During and after the formation of a CG regime, the interaction among DBSS actors is explored (in the framework) using collaborative dynamics. This includes three components: principled engagement (which refers to actors' dialogue and decision-making processes); shared motivation (which represents the level of trust and mutual understanding among actors and shared commitment to the collaboration); and capacity for joint action (which delineates the key resources required to sustain collaboration or implement joint actions, such as institutional innovation, leadership-building, and resource-leveraging) (Emerson and Nabatchi, 2015).

The capacity for joint action is generated and sustained by principled engagement and shared motivation. Principled engagement can help to foster actors' shared motivation. All of these dynamics, in turn, guide collaborative actions. These actions create outcomes that may lead to adaptations within the context of the CG itself (Emerson and Nabatchi, 2015).

### **3.8 Research paradigm**

A research paradigm is a set of beliefs that guide research action and influence the selection of methodological strategies to ensure the logic of the research process is consistent and will provide a clear outcome (Creswell, 2014). My research adopts an interpretivist paradigm based on a constructivist approach.

By this, I mean that I believe that the world is socially constructed by human interaction and that meaning is bound to – and informed by – particular contexts. A constructivist approach allows researchers to address research questions through their

interpretations of the meaning of social phenomena and from participants' perspectives (that is, how each participant understands the event and their world) (Lincoln and Denzin, 1998).

A constructivist approach is thus suitable to my research, given its focus on the subjective experiences of multiple actors in the CG of DBSS, and on drawing key insights from these experiences to build more abstract knowledge and theory of the workings of CG in any context. Collaborative governance regimes are, by nature, strongly affected and shaped by their specific cultural and socio-economic contexts, and a constructivist approach allows for this emphasis on context-specific enquiry.

### **3.9 Case study strategy and case study selection**

#### **3.9.1 Using a comparative case study strategy**

As a research strategy, case studies have been widely used in the fields of governance, planning, policy and public affairs (Yin, 2014), as well as in regional and territorial studies (Qiao, 2016). A case study approach facilitates research in which the “holistic and meaningful characteristics of real-life events” are retained (Yin, 2014, p107). It also allows researchers to understand a phenomenon or event within its practical context through detailed, in-depth data collection involving multiple sources of information (Creswell, 2009).

I have chosen to use a case study approach in my research because it allows me to capture the complex interactions between multiple groups of actors and stakeholders (such as local governments and DBSS enterprises) who are trying to figure out how a

collaborative governance scheme might work – and thrive – in reality. This grounded fieldwork has allowed me to examine actors’ experiences, behaviours and interactions closely.

### **3.9.2 Case study selection**

As my literature review (**Chapter 2**) describes, most of the existing DBSS literature uses a single case study strategy. Most of this research has also focused only on Chinese cities. There is very little research into the CG of DBSS in cities outside China, and there are currently few comparative analyses of how CG may differ between cities or countries.

I used a multiple case study method to fill this gap and selected two city-level cases (one Chinese city, Nanjing; and one Australian city, Sydney) for this comparative study.

The reason why I chose to carry out more than one case study is that a single case can hardly have the capacity to accommodate the diversity of possible interactions and outcomes in the governance of any DBSS. Comparative case studies are beneficial when the same phenomenon exists in various situations, because the method allows for testing whether results are replicated, similar, or contrasting (Yin, 1994).

There are several further reasons why a dual case study approach can provide more comprehensive insights into DBSS governance strategies and outcomes:

1. Two case studies can provide a broader understanding of the particular forms that CG takes in diverse cultural contexts.
2. Selecting two case studies allows for examining the phenomenon of CG in DBSS by using cross-cutting comparisons (Ragin and Rihoux, 2009). Common characteristics across cases can be presented, as well as unique features (Baxter and Jack, 2015).
3. Analysing more than one case study of the CG of DBSS can enhance and strengthen the validity and accuracy of empirical findings.

There was a practical reason for not selecting a larger number of case studies. This research is an individual doctoral thesis project, and has been necessarily constrained by a very tight timetable and limited financial resources. As such, it was impossible for me to survey a larger number of cities. To select two cities suitable for case study, I used the following four selection criteria:

1. Each city should have a certain scale of DBSS fleets, and local governments should have an interest in the local DBSS, as well as the ability to encourage and promote its development.
2. Each city should have begun to regulate the DBSS and incorporate some CG features (such as governance processes involving multiple stakeholders), since the primary aim of my study is to examine the dynamic interactions between various stakeholders in the governance of DBSS.
3. Each city should have significant differences in context (for instance, one in a developing country, and the other in a developed country). This helps

identify the diversity of socio-economic enablers and constraints, and policy and governance frameworks.

4. For practical reasons, I preferred to select cities where I had local contacts, especially with influential people such as government officials, private DBSS enterprise managers, leaders of social organisations, and scholars and experts in the relevant research fields. These contacts were essential in helping me access interviewees and in collecting fieldwork data.

According to the existing DBSS literature (Cao et al., 2021), dockless bike-share schemes have been launched in more than 20 countries and regions, including China, the U.S., the U.K., Australia, Thailand, the Netherlands, France, Austria, the Czech Republic, Italy, Japan, Singapore, India, Israel, the Middle East, Spain, Korea, Germany, and Malaysia. In my research design, I excluded countries (as sites of study) that do not have English or Mandarin as their primary language because those are the languages I speak fluently. It would thus be difficult for me to conduct in-depth interviews and observations in those countries.

As a result, only cities in China, the U.S., the U.K., and Australia were considered for my study. For practical reasons (including having a limited research budget and strict timescale for my research, and considering where I already had local connections), I selected Nanjing, China and Sydney, Australia as the two case studies for my research. For detailed demographic and geographical information about Nanjing and Sydney, please see **Chapters 4** and **5** of this thesis.

### **3.10 Methodology**

In this research project, I have adopted a qualitative methodology, which I found to be the most suitable option for exploring the dynamic interactions among various actors in the CG of DBSS in two global cities. Since collaborative governance of any kind is always complex, this was a valuable approach to understanding actors' diverse experiences and behaviours within specific contexts. This methodology also allowed me to have in-depth dialogue with key actors (such as representatives from government and private DBSS enterprises, as well as academics).

#### **3.10.1 Methods of data collection**

Two data collection strategies were used in my doctoral research project: desktop research; and field research. In addition, I used three data collection methods: documentary analysis; in-depth, semi-structured interviews; and focus group discussions.

My desktop research was undertaken using a documentary analysis approach. My field research used in-depth, semi-structured interviews and focus group discussions.

I used multiple research and data collection methods to gain a deeper understanding of the relationships between urban DBSS programs, CG frameworks, and human interactions. My aim was also to provide a comprehensive context against which to



analyse the case study findings and to triangulate the collected data. Table 7 outlines the relationship between my research methods and research questions.

### **Documentary analysis**

Documentary analysis can provide significant insights into specific contexts, provide a good foundation to refine and orient a research project, and corroborate data from other sources (Creswell, 2014; Yin, 2014).

In the course of my research, a large number of relevant documents associated with DBSS in Nanjing and Sydney were reviewed, including legislation, policy documents, enterprise strategies, development plans, announcements, reports, statistical data, news on local events, and official websites, with a specific focus on local legislation and policy documents.

These documents were useful in providing important information on policy background and external factors that affect the formation and development of governance frameworks of DBSS. They also helped to identify the key actors involved in the CG of DBSS in Nanjing and Sydney.

### **In-depth, semi-structured interviews**

I chose to conduct in-depth, semi-structured interviews as a powerful way of investigating issues through the experiences of the individuals involved in the CG of DBSS in Nanjing and Sydney. Most importantly, this is also a culturally appropriate

method for Chinese interviewees, since talking and communicating one-to-one or face-to-face is generally preferred over other data collection techniques (Yeung, 2009).

Before I designed my interview plan, I addressed the following two important questions:

1. The first question was about the number of interviewees I should select. In-depth research is generally characterised by small and manageable sample sizes (8–10 interviews for each case) to avoid being overwhelmed by data (Xian and Meng-Lewis, 2018). This sample size is considered optimal in collecting case study data if the interviewer wishes to achieve depth rather than breadth. For my research project, I conducted 20 interviews (10 in Nanjing; 10 in Sydney). (Please see Appendix C for a more detailed list of interviewees).
2. The second question was about the kinds of respondents I should actively select for interviews. The existing DBSS literature (Jin and Bian, 2018; Weng, 2018) identifies three major actor groups: government, private DBSS enterprises, and academics. As such, I decided to include all three groups of actors in my interviews.

The case study interviewees were selected based on their willingness to participate in this research project, and their experiences and diverse perspectives on the CG of DBSS in Nanjing and Sydney.

The recruitment of interviewees for in-depth, semi-structured interviews was conducted by snowball sampling. This method starts by sampling a small group of people with expertise relevant to the research questions; these participants, in turn, suggest others who have experience or insights pertinent to the research, and so on (Bryman, 2016). I started by sampling my existing local contacts and asking them for suggestions of potential interviewees or other people who might be able to introduce me to key actors involved in the CG of DBSS in Nanjing and Sydney.

**Table 7** Mapping the relationship between research methods, research questions and project participants/interviewees

<b>Research questions</b>	<b>Data collection methods</b>		
	<b>Documentary</b>	<b>Interviews</b>	<b>Focus groups</b>
<b>Research question 1:</b> How did contextual factors (including drivers) affect the engagement of government actors and DBSS enterprises in the CG of DBSS in Nanjing and Sydney between 2017 and 2021?	✓		
<b>Research question 2:</b> How did government actors and DBSS enterprise representatives dynamically interact within the CG frameworks guiding and governing DBSS in Nanjing and Sydney within that time frame?	✓	✓	✓
<b>Research question 3:</b>	✓	✓	✓

Research questions	Data collection methods		
	Documentary	Interviews	Focus groups
What collaborative outcomes and adaptations arose from the engagement and interactions between government actors and DBSS enterprises in these two respective sites of CG of DBSS?			
<b>Research question 4:</b> What are the implications of this research in terms of applying the Integrative Framework for Collaborative Governance within the wider research field of DBSS governance?	✓		

### 3.10.2 Methods of data analysis

All collected data was analysed to compare the similarities and differences between the information shared by interviewees, in focus group discussions, and in documents.

The data was analysed and summarised through a five-stage thematic coding approach:

- **Stage 1:** I prepared and organised the data using Microsoft Word software.
- **Stage 2:** I read through all of the data to familiarise myself with the information and to have an in-depth understanding of the documents. In this stage, the transcripts and field notes were classified into two categories: the Nanjing case study, and the Sydney case study. Each folder was subsequently divided into five sub-folders: information from government officials; information from DBSS enterprise staff; information from academics; group or focus discussion information; and information from analysed documents.

- **Stage 3:** I coded the data using themes identified from existing theoretical literature. The prefigured codes (Crabtree and Miller, 1999) were mainly drawn from key concepts that emerged from the Integrative Framework for Collaborative Governance (Emerson et al., 2012), my research questions, and new topics and ideas that emerged during my fieldwork. As the research evolved, these prefigured codes were reworked, modified, or expanded to include new, a posteriori codes. The 37 prefigured codes identified in this stage are shown in Table 8.
- **Stage 4:** I coded and categorised the data using the NVivo 12 platform and generated a description of the setting, people, and categories or themes for analysis. The description involved detailed information about actors, places and events. The data was coded according to geographical location (e.g., Nanjing or Sydney). In the Nanjing fieldwork, all of my interviewees spoke Mandarin, and all the original data (e.g., interview transcripts, voice records, and documents) was recorded in Chinese. As such, it has sometimes been challenging to select the appropriate English words to accurately express the exact meaning of certain Chinese words. I also made sure to present the results in a format that was easily accessible and clear to my research respondents so that they could check the data for accuracy.
- **Stage 5:** I interpreted and reflected on the collected data by asking how it responds to my research aims, questions and propositions. I also investigated the implications of this data for each in-depth case study (Creswell, 2007).

**Table 8** The list of prefigured codes used as tools of thematic analysis

<b>Prefigured codes</b>	
<b>System context</b>	Service conditions; policy framework; legal framework; laws; rules; regulations; socio-economic characteristics; culture; network; conflict; power relations
<b>Drivers</b>	Uncertainty; interdependence; incentives; initiator
<b>Collaborative dynamics</b>	Discovery; definition; deliberation; determinations; common interests; shared goals and purpose; tasks; fair and civil discourse; managing conflicts and disagreements; procedural and operational decisions; trust; mutual understanding; internal legitimacy; commitment; revealing information to others; feeling responsible and accountable for outcomes; procedural or institutional arrangements; knowledge-building; resource-leveraging.
<b>Collaborative outcomes</b>	Actions; outcomes; adaptations

### 3.10.3 Validity and reliability

Triangulation was used in various ways in this study to ensure the validity and reliability of collected data, and to improve the credibility of my research findings (Yin, 1994). The following methods were used:

- **Data triangulation:** collecting data through multiple sources (e.g., secondary data; and first-hand data).
- **Methodological triangulation:** collecting data through multiple data collection methods (e.g., a combination of documentary analysis; in-depth, semi-structured interviews; and focus group discussions).
- **Respondent triangulation:** collecting data from multiple respondents or interviewees (e.g., government officials, enterprise staff members, and academics). My doctoral thesis supervisors at UTS (and other scholars who

supported my research) also helped me by providing an external audit to check the validity and reliability of the collected data.

### **3.11 Ethics considerations**

My research carefully and stringently follows the ethical requirements of the UTS Responsible Conduct of Research Policy and the Australian Code for the Responsible Conduct of Research. This research was approved by the UTS Human Research Ethics Committee of the University of Technology Sydney (Protocol code: ETH20-5008; Date of approval: 29 June 2020).

I did not target any vulnerable persons or groups in recruiting interviewees for my research. All interviewees who participated in the data collection process were given the research information sheet and informed consent form when I invited them to participate. They were also informed (and gave their permission) that interviews would be digitally recorded.

All interviewees were informed that they could withdraw from the research at any time and that the data would only be seen by me (as the primary researcher) and my direct thesis supervisors at UTS, Professor Jason Prior and Professor Damien Giurco. I have respected and maintained the confidentiality and anonymity of all respondents. All interviewees chose to participate in my research project voluntarily.

The research data I have collected has been stored and secured in electronic or digital files. Only I (as the primary researcher) and my supervisors at UTS, Professor Jason Prior and Professor Damien Giurco, have access to this data. Information about interviewees was only used for this research project, and information about interviewees has only been disclosed with that interviewee's permission.



## References

- Agarwal, N. & Steinmetz, R. (2019). Sharing Economy: A Systematic Literature Review. *International Journal of Innovation and Technology Management*, 16 (6), 1930002.
- Ansell, C. & Gash, A. (2008). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research & Theory*, 18 (4), 543-571.
- Aviv-Reuven, S. & Rosenfeld, A. (2021). Publication patterns' changes due to the COVID-19 pandemic: a longitudinal and short-term scientometric analysis. *Scientometrics*, 126 (8), 6761-6784.
- Baxter, P. & Jack, S. (2015). Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers. *Qualitative Report*, 13 (4), 544-559.
- Bogdan, R. & Biklen, S. (2007). *Qualitative research for education: An introduction to theories and methods* (5th ed.). Boston, Massachusetts: Allyn & Bacon.
- Bryman, A. (2016). *Social research methods* (5th ed.). Oxford, UK: Oxford University Press.
- Bryson, J.M., Crosby, B.C. & Stone, M.M. (2006). The Design and Implementation of Cross-Sector Collaborations: Propositions from the Literature. *Public Administration Review*. 66 (1), 44-55.
- Cao, J., Prior, J. & Giurco, D. (2022). Government and Private Company Collaboration in the Governance of Shared Mobility Schemes: A Case Study of Dockless Bike-Sharing Schemes in Sydney, Australia. *Sustainability*. 14 (20), 13141
- Cao, J., Prior, J., Gu, D. & Giurco, D. (2022). How do government and industry engage in the collaborative governance of dockless bike-sharing schemes in Nanjing, China? *Urban Policy and Research*, 40 (3), 1-15.
- Cao, J., Prior, J. & Moutou, C. (2021). The governance of dockless bike-sharing schemes: A systemic review of peer-reviewed academic journal papers between 2016 and 2019. *Cleaner Engineering and Technology*, 4, 100140.
- Combs, J. & Onwuegbuzie, A. (2010). Describing and Illustrating Data Analysis in Mixed Research. *International Journal of Education*, 2 (2), 1-23.
- Creswell, J.W. (2007). *Qualitative inquiry and research design: choosing among five approaches* (2nd ed.). Thousand Oaks, California: Sage Publications.
- Creswell, J.W. (2009). *Research design: qualitative, quantitative, and mixed methods approaches* (3rd ed.). Thousand Oaks, California: Sage Publications.

- Creswell, J.W. (2014). *Research design: qualitative, quantitative, and mixed methods approaches* (4th ed.). Thousand Oaks, California: Sage Publications.
- Du, M.Y. & Cheng, L. (2018). Better Understanding the Characteristics and Influential Factors of Different Travel Patterns in Free-Floating Bike Sharing: Evidence from Nanjing, China. *Sustainability*, 10 (4), 1244-1244.
- Emerson, K. & Nabatchi, T. (2015). *Collaborative Governance Regimes*. Washington, D.C.: Georgetown University Press.
- Emerson, K., Nabatchi, T. & Balogh, S. (2012). An Integrative Framework for Collaborative Governance. *Journal of Public Administration Research & Theory*, 22 (1), 1-29.
- Fishman, E. (2016). Bikeshare: A Review of Recent Literature. *Transport Reviews*, 36 (1), 92-113.
- Flynn, B.B., Sakakibara, S., Schroeder, R.G., Bates, K.A. & Flynn, E.J. (1990). Empirical research methods in operations management. *Journal of Operations Management*, 9 (2), 250-284.
- Fox, J., Murray, C. & Warm, A. (2003). Conducting research using web-based questionnaires: Practical, methodological, and ethical considerations. *International Journal of Social Research Methodology*, 6 (2), 167-180.
- Gill, P. & Baillie, J. (2018). Interviews and focus groups in qualitative research: an update for the digital age. *British Dental Journal*, 225 (20), 668-672.
- Guest, G., Bunce, A. & Johnson, L. (2006). How Many Interviews Are Enough?: An Experiment with Data Saturation and Variability. *Field Methods*, 18, 59-82.
- Guo, Y., Yang, L. & Chen, Y. (2022). Bike Share Usage and the Built Environment: A Review. *Frontiers in Public Health*, 10 (1), 848169.
- Gu, Z., Zhu, Y., Zhang, Y., Zhou, W. & Chen, Y. (2019). Heuristic Bike Optimization Algorithm to Improve Usage Efficiency of the Station-Free Bike Sharing System in Shenzhen, China. *ISPRS international journal of geo-information*, 8, 239.
- Han, S.S. (2020). Co-producing an urban mobility service? The role of actors, policies, and technology in the boom and bust of dockless bike-sharing programmes. *International Journal of Urban Sustainable Development*, 14 (1), 1-16.

- Han, Y. & Chen, L. (2019). Bicycle-sharing governance dilemma and its solution: based on CSG analysis framework. *Journal of Sichuan University of Science & Engineering (Social Sciences Edition)*, 34, 40-61.
- Heydari, S., Konstantinoudis, G. & Behsoodi, A.W. (2021). Effect of the COVID-19 pandemic on bike-sharing demand and hire time: Evidence from Santander Cycles in London. *PloS one*, 16 (12), e0260969.
- Heymes, C. & Levinson, D. (2019). Stationless in Sydney: The Rise and Decline of Bikesharing in Australia. *Transport Findings*.
- Hong, Q.N. & Pluye, P. (2019). A Conceptual Framework for Critical Appraisal in Systematic Mixed Studies Reviews. *Journal of Mixed Methods Research*, 13 (4), 446-460.
- Hussey, J. & Hussey, R. (1997). *Business research: a practical guide for undergraduate and postgraduate students*. London, UK: Palgrave Macmillan.
- Jia, L., Liu, X. & Liu, Y. (2018). Impact of Different Stakeholders of Bike-Sharing Industry on Users' Intention of Civilized Use of Bike-Sharing. *Sustainability*, 10 (5), 1437.
- Jiang, N. & Cai, J.M. (2017). How government play their roles in the sharing economy in the perspective of bike-sharing. *Hebei Academic Journal*, 37, 138-142. [In Chinese]
- Jin, J. & Bian, S.J. (2018). The cooperative governance route of urban shared bicycle based on stakeholder perspective: a case study of Nanjing, Jiangsu province. *Urban Development Studies*, 25, 92-99. [In Chinese]
- Johnson, R. & Christensen, L. (2014). *Educational Research Quantitative, Qualitative, and Mixed Approaches* (5th ed.). Thousand Oaks, California: Sage Publications.
- Joinson, A. (1999). Social desirability, anonymity, and internet-based questionnaires. *Behavior research methods, instruments, & computers*, 31, 433-438.
- Kim, T.-B. (2010). Collaborative governance for sustainable development in urban planning in south korea. Dissertation, The University of Birmingham.
- Koschmann, M.A., Kuhn, T.R. & Pfarrer, M.D., 2012. A Communicative Framework of Value in Cross-Sector Partnerships. *Academy of Management Review*, 37, 332-354.

- Lan, J., Ma, Y., Zhu, D., Mangalagiu, D. & Thornton, F.T. (2017). Enabling Value Co-Creation in the Sharing Economy: The Case of Mobike. *Sustainability*, 9 (9), 1504.
- Lan, L. (2019). Research on bike-sharing behavior from the perspective of communication ecology. *Minzu University of China*, 22, 1-14. [In Chinese]
- Li, Z., Shang, Y., Zhao, G. & Yang, M. (2022). Exploring the Multiscale Relationship between the Built Environment and the Metro-Oriented Dockless Bike-Sharing Usage. *International Journal of Environmental Research and Public Health*, 19 (4), 2323.
- Lincoln, Y.S. & Denzin, N.K. (1998). *The landscape of qualitative research: theories and issues*. Thousand Oaks, California: Sage Publications.
- Liu, G.R. (2017). Shared Economy: The Subversion of the Traditional Economic Model. *Economist* 29, 97–104.
- Liu, Ma, Zhu & Ji (2019). An Investigation on Responsible Innovation in the Emerging Shared Bicycle Industry: Case Study of a Chinese Firm. *Journal of Open Innovation*, 5 (3), 42.
- Liu, Z. (2020). Collaborative governance for responsible innovation in the context of sharing economy: studies on the shared bicycle sector in China. *Journal of Open Innovation*. 6 (2), 1-14.
- Lune, H. & Berg, B.L. (2017). *Qualitative research methods for the social sciences*, (Ninth ed.). Harlow, England: Pearson.
- Ma, Y., Lan, J., Thornton, T., Mangalagiu, D. & Zhu, D.J. (2018). Challenges of collaborative governance in the sharing economy: The case of free-floating bike sharing in Shanghai. *Journal of Cleaner Production*, 197, 356-365.
- Mason, M. (2010). Sample size and saturation in PhD studies using qualitative interviews. *Forum, Qualitative Social Research*, 11 (3), 1428.
- Merriam, S.B. & Grenier, R.S. (2019). *Qualitative research in practice: examples for discussion and analysis* (2nd ed.). San Francisco, California: Jossey-Bass.
- Mody, M.A., Hanks, L. & Cheng, M. (2021). Sharing economy research in hospitality and tourism: a critical review using bibliometric analysis, content analysis and a quantitative systematic literature review. *International Journal of Contemporary Hospitality Management*, 33 (5), 1711-1745.

- Montoya-Weiss, M.M. & Calantone, R. (1994). Determinants of new product performance: A review and meta-analysis. *The Journal of Product Innovation Management*, 11 (5), 397-417.
- Naga, V.K.J. & Kodali, R. (2014). A literature review of empirical research methodology in lean manufacturing. *International Journal of Operations & Production Management*, 34 (8), 1080-1122.
- Pham, T.H., Steven, W. & Kerry, T. (2016). Collaboration between academics and library staff: a comparative study of two universities in Australia and Vietnam. Dissertation, Monash University.
- Qiao, M. (2016). Economic Linkages of China's Small Towns: Urban-Rural Integration in a Learning Economy. Dissertation, The University of Manchester.
- Ragin, C.C. & Rihoux, B. (2009). *Configurational comparative methods qualitative comparative analysis (QCA) and related techniques*. Thousand Oaks, California: Sage Publications.
- Ricci, M. (2015). Bike sharing: A review of evidence on impacts and processes of implementation and operation. *Research in Transportation Business & Management*, 15, 28-38.
- Rindfleisch, A., Malter, A.J., Ganesan, S. & Moorman, C. (2008). Cross-Sectional versus Longitudinal Survey Research: Concepts, Findings, and Guidelines. *Journal of Marketing Research*, 45 (3), 261-279.
- Rojanakit, P., Torres De Oliveira, R. & Dulleck, U. (2022). The sharing economy: A critical review and research agenda. *Journal of Business Research*, 139, 1317-1334.
- Selin, S. & Chevez, D. (1995). Developing a collaborative model for environmental planning and management. *Environmental Management*, 19, 189-195.
- Si, H., Shi, J.-G., Wu, G., Chen, J. & Zhao, X. (2019). Mapping the bike sharing research published from 2010 to 2018: A scientometric review. *Journal of Cleaner Production*, 213, 415-427.
- Soni, G. & Kodali, R. (2012). A critical review of empirical research methodology in supply chain management. *Journal of Manufacturing Technology Management*, 23 (6), 753-779.
- Sun, Y.Y. (2018). Sharing and Riding: How the Dockless Bike Sharing Scheme in China Shapes the City. *Urban Science*, 2 (3), 68-68.

- Vallez, C.M., Castro, M. & Contreras, D. (2021). Challenges and Opportunities in Dock-Based Bike-Sharing Rebalancing: A Systematic Review. *Sustainability*, 13 (4), 1829.
- Van Waes, A., Farla, J. & Raven, R. (2020). Why do companies' institutional strategies differ across cities? A cross-case analysis of bike sharing in Shanghai & Amsterdam. *Environmental Innovation and Societal Transitions*, 36, 151-163.
- Wang, J., Huang, J. & Dunford, M. (2019). Rethinking the Utility of Public Bicycles: The Development and Challenges of Station-Less Bike Sharing in China. *Sustainability (2071-1050)*, 11 (6), 1539-1539.
- Weng, S.H. (2018). Research on the holistic governance innovation of urban bike-sharing regulatory system. *E-Government*, 15, 21-31. [In Chinese]
- Xian, H. & Meng-Lewis, Y. (2018). *Business Research Methods for Chinese students: A practical guide to your research project*. Thousand Oaks, California: Sage Publications.
- Yeung, H.W.-C. (2009). Regional Development and the Competitive Dynamics of Global Production Networks: An East Asian Perspective. *Regional Studies*. 43 (3), 325-351.
- Yin, R.K. (1994). *Case study research: design and methods* (2nd ed.). Thousand Oaks, California: Sage Publications.
- Yin, R.K., 2014. *Case study research: design and methods* (5th ed.). Thousand Oaks, California: Sage Publications.
- Zhou, J., Guo, Y., Sun, J., Yu, E. & Wang, R. (2022). Review of bike-sharing system studies using bibliometrics method. *Journal of Traffic and Transportation Engineering*, 9 (4), 608-630.

# Chapter 4: Nanjing case findings

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## Paper preface

This chapter includes a re-formatted, co-authored peer-reviewed paper. The full citation for the paper, including all authors, is as follows:

**Cao, J.,** Prior, J., Gu, D., Giurco, D. (2022). How do government and industry engage in the collaborative governance of dockless bike-sharing schemes in Nanjing, China? *Urban Policy and Research*, 3, 111-146.

## Statement of contribution

Jun Cao mainly contributed to the ideas contained in this paper. Jun Cao collected the data and wrote the manuscript. Jason Prior and Damien Giurco supervised the overall work and polished the wording of this paper. Dasong Gu provided constructive advice to improve the manuscript.

## Research highlights

1. Providing insights into how key DBSS stakeholders collaborate through a case study of government and DBSS enterprise interactions in Nanjing's DBSS from 2017 to 2020.
2. Adopting the Integrative Framework for Collaborative Governance as a theoretical tool and carrying out qualitative analysis of policies and interviews with government and enterprise staff.

3. Highlighting the advantages of local governments playing a lead role in collaborative urban governance processes (such as being able to rapidly mobilise administrative and financial resources).
4. Highlighting the potential negative impacts of this form of government-led CG (such as stifling incentives for innovation by DBSS enterprise actors).





## How Do Government and Industry Engage in the Collaborative Governance of Dockless Bike-sharing Schemes in Nanjing, China?

Jun Cao, Jason Prior, Dasong Gu & Damien Giurco

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### Abstract

While existing studies have broadly examined the collaborative governance of dockless bike-sharing schemes (DBSS) in global cities, few provide detailed insights into how DBSS stakeholders engage in particular cultural contexts. This paper addresses this gap through a case study of government and industry interactions in Nanjing's DBSS from 2017 to 2020. Our approach is informed by the Integrative Framework for Collaborative Governance. We draw on qualitative analysis of policies and interviews with government officials and industry leaders. A key finding is the identification of a shift from centralised to distributed power dynamics among stakeholders, affirming the need for culturally-specific studies of collaborative governance.

### Keywords

Sustainable transportation, Dockless bike-sharing schemes, Collaborative governance,  
Government, Industry, Integrative Framework for Collaborative Governance

## 4.1 Introduction

The “sharing economy” is expanding, with a broad range of urban services increasingly shareable (Hamari et al., 2016; Van Eijk and Gascó, 2018). The use of online and smartphone platforms by businesses such as Airbnb, Uber and Hellobike has enabled urban residents to rent out rooms in their houses, take taxi rides in other people’s private cars, and use a bike whenever they need one (Cao et al., 2021).

Bike-sharing schemes (BSS) are a significant step in the sharing of mobility. Smartphone-enabled dockless bike-sharing schemes (DBSS) are the latest form of BSS. A mobile app is used to unlock and pay for the use of the bike, and the user can pick up and leave a bike at their convenience simply by scanning its QR code (Jia et al., 2018). DBSS are cheaper and more flexible than docked BSS, providing easier access to bikes (Sun, 2018). In June of 2015, the private enterprise Ofo launched its first DBSS fleet within Peking University’s campus, which symbolised the birth of DBSS (Shi et al., 2018; Yin et al., 2019; Zhang et al., 2021). DBSS have experienced cycles of boom and bust, expanding to hundreds of cities worldwide before withdrawing many services in the years since 2016 due to governance and financial issues, but they are still operating in many cities today (Han, 2020).

While DBSS bring benefits to cities, they also pose management challenges. DBSS users leave bikes on pedestrian paths and in public squares or parks, for instance, blocking pathways and creating disorder. In the initial phasing-in of DBSS, some governments responded to these issues by permanently removing misplaced bikes; others announced outright bans on DBSS (Ma et al., 2018; Chen, 2019). These all-or-

nothing responses triggered a public outcry, with those governments fiercely criticised for their disregard for the public interest and resistance to market-driven innovation.

More recently, a collaborative governance (CG) approach involving both the public and private sectors has become a viable solution to some of these issues (Lan et al., 2017; Han, 2020). CG is an umbrella concept that emphasises cross-sectoral and multi-institutional arrangements between public and private sector organisations to address public problems or advance common goals (Ansell and Gash, 2008). In major cities within China, including Shanghai (Wang et al., 2020a), Beijing (Wang et al., 2019) and Guangzhou (Guo et al., 2017), this CG approach has increasingly been used to support DBSS.

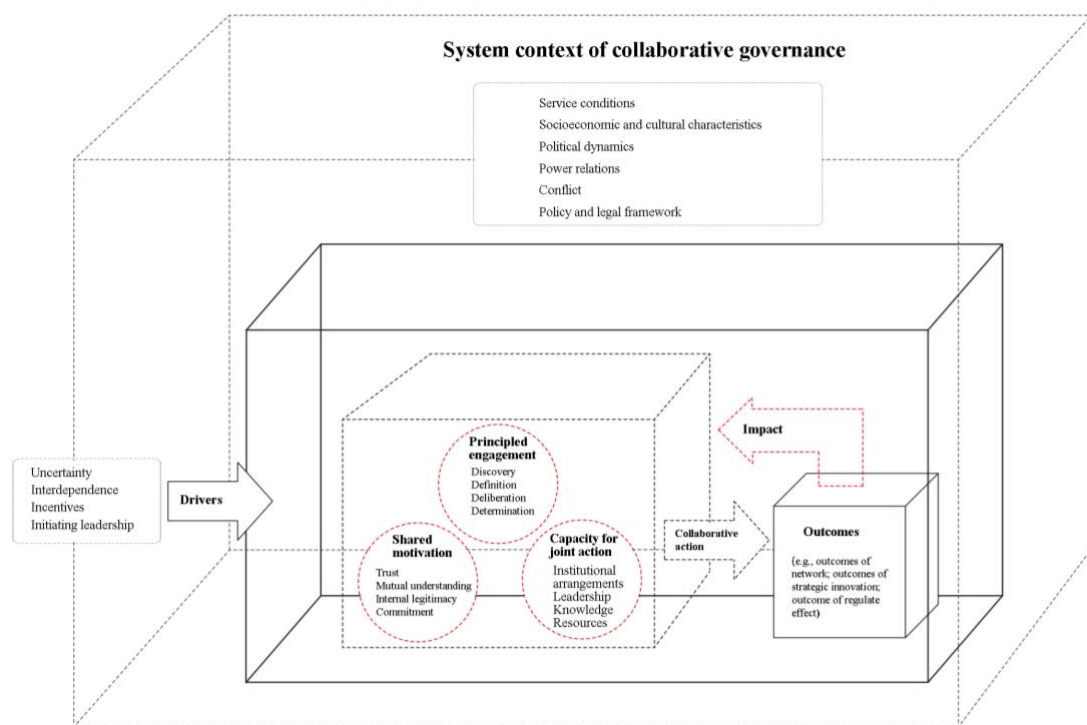
There is a growing body of research examining the CG of DBSS in China's cities (Guo et al., 2017; Qin and Wang, 2017; Ma et al., 2018; Zheng and Chen, 2018; Wang et al., 2020b), but a recent review identified persistent research gaps (Cao et al., 2021). There are few detailed studies (Ma et al., 2018; Wang et al., 2020b) of how government and industry actors engage in these CG processes, nor of the diverse factors that influence their engagement. Furthermore, most research in China has concentrated on the CG of DBSS in a few mega-cities (Beijing and Shanghai), with limited studies in second-tier cities such as Nanjing. This paper addresses these gaps by presenting findings from an original empirical study of how government and industry actors engaged in the CG of Nanjing's DBSS between 2017 and 2020.

CG is a key component of the policy framework that guided the development of Nanjing's DBSS (Jin and Bian, 2018; Ma et al., 2018). Our research methods draw on the Integrative Framework for Collaborative Governance, a comprehensive framework designed to delineate the complex practices that underpin CG in any setting (Emerson et al., 2012). Our insights are based on analysis of policies and guidelines, semi-structured interviews with government officials and industry leaders, and observations of government and industry interactions at key Nanjing DBSS meetings. A key finding is that the initial asymmetrical power relations between government and industry in governing the DBSS shifted over time to a less centralised, distributed model of power-sharing. We anticipate our findings will be of benefit to researchers, business managers, entrepreneurs and policymakers involved in the sustainable development of DBSS.

#### **4.2 Conceptualising industry and government engagement in collaborative governance of Nanjing's DBSS**

A growing number of frameworks have sought to conceptualise the rise of CG in urban settings (Ring and Van de Ven, 1994; Selin and Chevez, 1995; Bryson et al., 2006; Ansell and Gash, 2008; Koschmann et al., 2012). While many of these collaborative governance frameworks have been designed to understand particular purposes (Ring and Van de Ven, 1994; Selin and Chevez, 1995; Bentrup, 2001), few are transferable to different geographic, political and cultural contexts, and there is little attention paid to collaborative dynamics between actors, which is a key focus of this study.

Our study adopted Emerson et al. (2012)'s Integrative Framework for Collaborative Governance (Figure 18) to guide our method of analysis for two key reasons. Firstly, it is the most developed framework for conceptualising collaborative dynamics among multiple stakeholders (Ma et al., 2018). Secondly, the Integrative Framework is designed to be useful in comparative studies of CG across a range of international contexts, since it acknowledges the importance of geography, culture and politics in determining collaborative dynamics (Ma et al., 2018).



**Figure 18** Integrative Framework for Collaborative Governance. Source: by author, based on Emerson et al. (2015), p. 83.

Using the Integrative Framework for Collaborative Governance, our case study deepens understandings of how government and industry engaged in the CG of Nanjing's DBSS (between 2017 and 2020) by providing insight into the following factors:

- System context (which includes drivers, opportunities and constraints) and its influence on government and industry interactions directing Nanjing's DBSS between 2017 and 2020 (Figure 18).
- CG regime, which is the particular mode of decision-making that determines prevailing patterns of behaviour and activity within cross-sector collaborations (Emerson and Nabatchi, 2015). Key to understanding the CG regime is the ability to delineate the collaborative dynamics that constitute and sustain it.
- Collaborative dynamics comprise three interactive components: principled engagement, shared motivation and capacity for joint action. These collaborative dynamics guide collaborative actions. These collaborative dynamics guide collaborative actions, which were undertaken jointly by government and industry between 2017 and 2020 (e.g., delivery of DBSS to the public is improved by government and industry working together) (Figure 18).
- Collaborative outcomes in Nanjing's DBSS that result from the collaborative actions generated by government and industry, and the adaptations that resulted from these outcomes. Examples of outcomes and adaptations might include new institutional arrangements, leadership, shared knowledge, and leverage of resources that might improve or hinder the operational success and sustainability of any CG regime of DBSS in Nanjing.

Three research questions have guided our analysis so that it is aligned with the key features of the Integrative Framework for Collaborative Governance. These questions are outlined in Table 9.

**Table 9** Relationship between research questions and the components of the Integrative Framework

No.	Research questions	Relevant component of the Integrative Framework
1	How does the system context (including drivers) affect government and industry engagement in the CG for DBSS in Nanjing between 2017-2020?	• System context
2	How did government and industry dynamically interact in the CG regime guiding DBSS in Nanjing between 2017-2020?	• Collaborative dynamics
3	What collaborative actions, outcomes and adaptations arose from government and industry engagement in the CG of DBSS in Nanjing between 2017-2020?	• Collaborative actions, outcomes and adaptations

### 4.3 Research methods

We used a qualitative case study approach to address these research questions (detailed in Table 9). Case studies are widely used to provide detailed understandings of regional and territorial governance (Yin, 1994). A case study methodology allows researchers to understand a phenomenon or event within its real-life context (Creswell, 2007). It also allows complex interactions to be pictured between interdependent actors with different interests and concerns about desirable solutions (Klijn, 2012).

#### 4.3.1 The selection of an urban DBSS for the study

Due to our case study methodology, only one DBSS program was chosen for in-depth investigation. The three selection criteria used to select Nanjing’s DBSS are outlined



in Table 10. The data that informed this selection was sourced from existing academic literature and local news media. While a few cities in China met our criteria, Nanjing was a clear first choice for several reasons. Firstly, Nanjing was a pioneer in introducing DBSS within China. Secondly, Nanjing was one of the first cities in China to implement CG in their DBSS. Thirdly, the research team had a strong local network of influential contacts in Nanjing, including government officials, business managers and scholars in the field of collaborative governance. These contacts were essential in facilitating access to interviewees and permission to collect data.

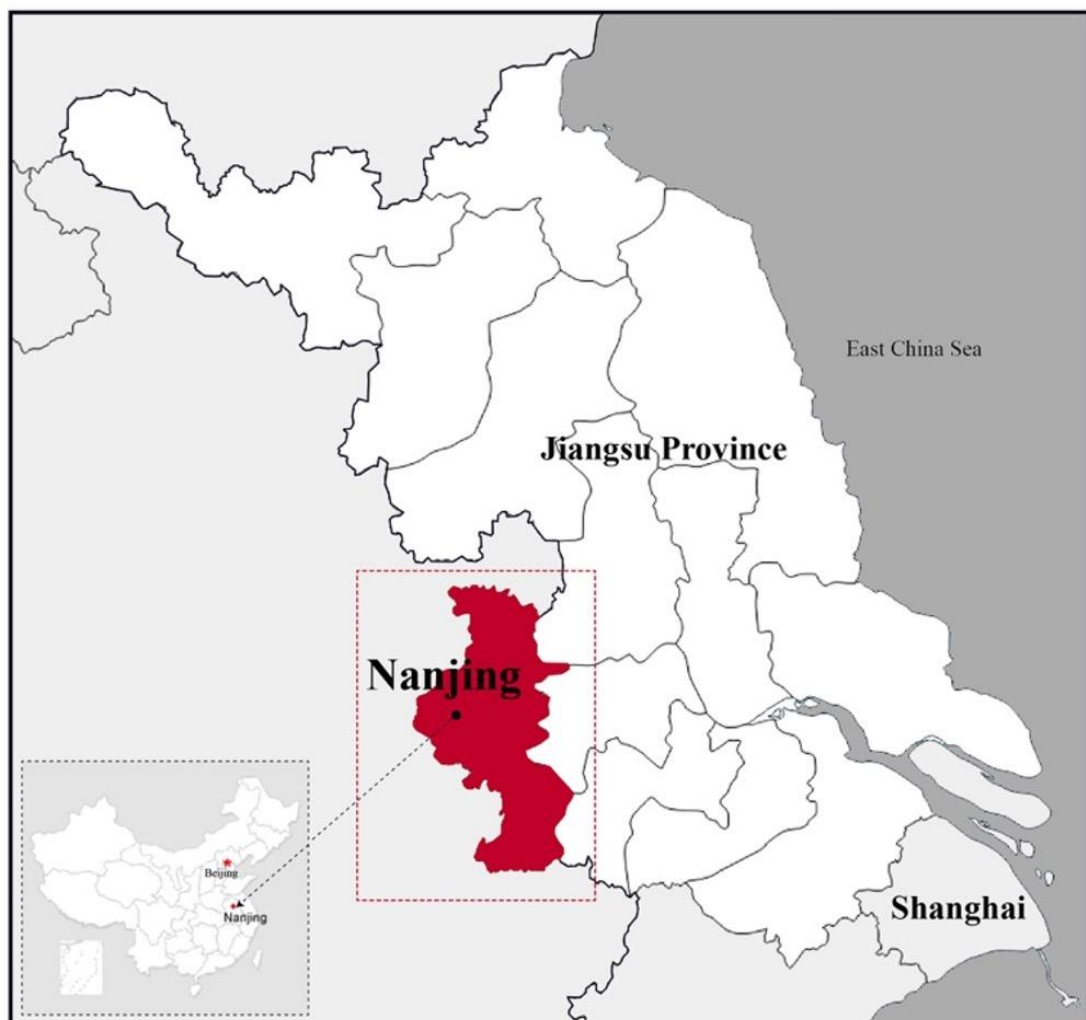
**Table 10** Selection criteria for case study

No.	Selection criterion
SC1	The DBSS had been operating in the selected city in China for at least one year.
SC2	The DBSS within the city was regulated and had some features of CG, such as governance processes involving multiple actors and collaborative actions.
SC3	The researchers had support from local and influential networks, enabling access to key stakeholders and leaders within the DBSS.

Nanjing is the capital of Jiangsu province and a core city of the Yangtze River Delta economic zone, which is located in the East China region (see Figure 19 and Table 11). The DBSS was launched in Nanjing in 2016. At its peak in 2017, 13 different enterprises had flooded Nanjing with more than 700,000 shared bikes (Liu, 2020).

While Nanjing has 11 administrative districts, the majority of the DBSS within Nanjing are distributed across six main districts: the Xuanwu, Qinhuai, Jianye, Gulou,

Qixia and Yuhuatai districts (see Figure 19). This case study thus focuses only on these districts. The time period for this case study is from April 2017 (the first time these collaborations emerged in the Qinhuai district of Nanjing, before spreading to other districts) to December 2020, the final date that data was collected by the research team. There are still three major DBSS enterprises in operation across these districts of Nanjing, though operations were significantly reduced during the COVID-19 pandemic.



**Figure 19** Location of Nanjing within China. Source: By author

**Table 11** Background information about Nanjing and the DBSS

<b>Population (million)</b>	8.5
<b>Area (km<sup>2</sup>)</b>	6,587
<b>Number of administrating districts</b>	11
<b>Number of shared bikes in existence</b>	320,000
<b>Number of surviving DBSS brands</b>	3 (Qingju, Meituan, Hellobike)

#### **4.3.2 Methods of data collection and analysis**

Two data collection strategies were used for this study: desk research and field research. The desk research involved collecting secondary data and contextual materials associated with DBSS and its governance in Nanjing, including legislation, policy documents, enterprise strategies, development plans, announcements, reports, statistical data, news items on local events, and official websites. The field research involved collecting primary data through interviews, attending public symposia, visiting relevant organisations, and observing focus group discussions and meetings.

The primary field research method used for this study was conducting in-depth, semi-structured interviews with key actors involved in the governance of Nanjing's DBSS. These kinds of interviews are a meaningful way to investigate wider structural issues by exploring the experiences of individual stakeholders (Seidman, 2019). It is also a culturally appropriate method of data collection in China, where talking and communicating face-to-face is often preferred over other data collection techniques (Yeung, 2009).

Ten interviews were carried out with key stakeholders between July 2020 and December 2020 (Table 12). The interviewees included:

- Four government officials in the Nanjing administrative and regulative departments. China's government has many levels, including village, township, county, district and prefecture, city, provincial, and national. We conducted interviews with officials working at district and city levels. In China's unitary intergovernmental system, the relationship between higher authorities and subordinate offices was a vertical principle–agent relation (Jing et al., 2015).
- Three regional managers of industry (in this paper, 'industry' refers to private DBSS enterprises rather than state-owned enterprises).
- Three researchers based at university think tanks, who specialise in transportation planning and traffic laws.

Interviewees were included in the study only if they had directly participated in the development and governance processes of Nanjing's DBSS. Before each interview, desktop research was used to identify the recent key DBSS-related activities of the interviewee's department or organisation. This helped to customise the interview questions.

The primary researcher also collected data through the following methods:

- By observing three focus group discussions: one in the Nanjing Transportation Bureau (NTB) in May 2020, one in the Nanjing Urban Administration Bureau (NUAB) in July 2020, and one in the Nanjing Traffic Police Bureau (NTPB)

in August 2020. The discussions focused on the introduction of government regulation mechanisms for DBSS.

- By attending a colloquium organised by Hellobike (a private DBSS enterprise) in August 2020, where the main focus was the DBSS and its CG in Nanjing. Most of the participants were representatives from universities or from Hellobike's senior management teams. The participants discussed the responsibilities of local government and industry, the influence of DBSS on the quality of Nanjing's public domain, and the national policies for DBSS development.

The transcripts and field notes from these discussions were analysed using a five-step thematic coding approach described by Creswell (2009). Stage 1 involved preparing and organising the data using Microsoft Word software. In Stage 2, the interview transcripts and collected documents were coded using "prefigured" codes chosen by the research team (Creswell, 2013; Yin, 2014). These codes included the following: key theoretical concepts of the Integrative Framework for Collaborative Governance (system context, including drivers; collaborative dynamics; actions; outcomes; adaptations), second-level categories (principal engagement; shared motivation; joint capacities), and third-level categories (discovery; trust; procedural and institutional arrangements).

Stage 3 focused on axial coding to confirm that the concepts and sub-categories accurately represented the data and to explore how the concepts and categories were linked. Stage 4 unified the major concepts through selective coding. Stage 5 interpreted

and reflected on the data by asking how the collected data responded to the research questions and offered meaningful material for the case study.

To maintain the anonymity of interviewees, all data (including direct quotations from interview material) has been de-identified using a coding system in the format of ‘City – organisational type – interviewee number,’ where ‘NJ’ stands for Nanjing, ‘G’ for government departments, ‘I’ for industry, and ‘A’ for academia.

**Table 12** List of interviewees and coding system

<b>Interviewee code</b>	<b>Organisation</b>	<b>Position</b>
NJ-G-01; NJ-G-02; NJ-G-03; NJ-G-04	City and District Urban Administration Bureau	Senior director
NJ-I-01; NJ-I-02; NJ-I-03	DBSS enterprise	Senior manager
NJ-A-01; NJ-A-02; NJ-A-03	University think tank	Professor

#### **4.4 Results**

The following sections present our findings in relation to the study’s three main research questions (RQ).

The findings addressing RQ1 provide insight into the system context in Nanjing that defined the style of CG that emerged in DBSS between 2017 and 2020. The system context factors include drivers, service conditions, socio-economic and cultural characteristics, political dynamics and power relations, conflict, and policy and legal

frameworks. Drivers discussed in our findings include uncertainty, incentives, interdependence, and the ability of stakeholders to initiate leadership.

The emergence of Nanjing's DBSS was marked by Dingding Bike, which launched its first bike fleet in December 2016. The government did not immediately regulate the DBSS, believing it was complementary to the public transport system. In early 2017, the government was hesitant to engage with industry due to uncertainty resulting from limited knowledge of the workings of DBSS. As one government official noted, "The Nanjing government had not issued any regulations on DBSS before, and no one knew where the DBSS was going or how to manage it in the beginning" (NJ-G-01). This initial lack of government intervention was interpreted by industry as a significant commercial opportunity, which led to private enterprises inundating the city with bikes. This had a series of negative impacts on the service conditions of DBSS, including an oversupply of bikes, overconsumption of parking resources, and public disturbance.

Government and industry were frequently in conflict in Nanjing during the first half of 2017 because they had different ideas about how to resolve these negative impacts. The government, for instance, wanted to reduce the number of bikes to keep order in public urban spaces. By contrast, industry wanted to increase the number of bikes to capture market share. The government deployed urban management squads to confiscate oversupplied bikes and maintain order on the city's streets. Since this was done without informing the DBSS industry in advance, industry leaders strongly resented the decision. As a result, the DBSS industry refused to pay fines to reclaim

their bikes, and more than half a million confiscated bikes were stacked in “DBSS graveyards” (NJ-G-01).

At that stage, the government still had not established a formal regulatory structure for DBSS, and industry was avoiding real dialogue with the government. However, a key turning point during 2017 – which provided an incentive for government and industry collaboration – was a series of significant adverse impacts that DBSS had on the ability of the city to function. On Tomb Sweeping Day (April 5) in 2017, the Confucius Temple area in Qinhuai District was blocked by more than 50,000 bikes. This traffic jam triggered the first collaborative action between government and industry to resolve the emergency. The Qinhuai district government agreed to let maintenance staff from private DBSS enterprises join forces with the government’s law enforcement squads to clear the roads.

In the wake of this experience, the Qinhuai district government initiated the first CG model for DBSS in Nanjing. Following these significant disruptions to the city in 2017, a pragmatic understanding emerged that effective governance of DBSS was interdependent on both government and industry, and could not be addressed or resourced by one sector alone. As one government official explained, “Relying exclusively on administrative penalties to control industry involves huge economic costs. We need to employ workers to remove bikes and rent the spaces needed for the impounded bikes, which we cannot afford. We need to work together with industry to share the risks of DBSS” (NJ-G-02).



An industry respondent noted, “If we want to control DBSS well to enable our business success, we need the support of government resources and authority, such as legitimacy, parking, and road resources” (NJ-I-02). This growing awareness of the value of collaboration led to ongoing and substantive communication between government and industry in response to the Guidance on Encouraging and Regulating the Development of Internet Bike Rental (Guiding Opinion), a government framework that explicitly encouraged CG. Qinhuai was the first district to adopt this CG model, in April 2017. Four months later, the CG model was praised by the city government. After that, the CG model was quickly imitated and adopted by other district governments in Nanjing.

Since mid-2017, the ongoing development of CG for Nanjing’s DBSS has been influenced by the city’s socio-economic and cultural character, political dynamics and power relations, and policy and legal frameworks. These factors are discussed in the following section.

Like other regions in China, Nanjing is governed by a strong centralised government, based on the belief that active and effective government is “a fundamental component of a good society” (NJ-A-01). China’s long traditions of bureaucratisation and administrative culture have helped to shape this centralised government, which comprehensively controls a broad range of public management activities within China and its cities. This is reflected in the hierarchical power relations within DBSS collaborations in Nanjing, through which the local government can exert pressure on industry. As an industry respondent mentioned, “There exists ample space for the government to exert direct pressure on industry” (NJ-I-01).

Government controls key public resources, including policy directives, funding, urban infrastructure, and road resources. Industry tends to have limited decision-making powers when collaborating with local government. Some government officials and academics saw this asymmetrical power dynamic as a potential positive, believing that government-led collaboration could rapidly mobilise resources to support DBSS operations and serve the public interest.

The development of CG within Nanjing DBSS since 2017 has thus been supported *and* constrained by government policy frameworks. Premier Li Keqiang openly encouraged city governments to support shared mobility initiatives like DBSS and to adopt a prudent yet accommodating approach to regulation. National policies and directives, such as ‘Internet +’ and ‘mass entrepreneurship and innovation,’ encourage city governments to embrace DBSS and introduce proper management rules. These government policies have made it somewhat easier for industry to fast-track business registration, expand their operations within cities, and use public resources. While a growing number of policies have supported CG of DBSS in Nanjing, more substantive supports – like legal frameworks for DBSS – are still lacking.

A further system context that continues to influence the evolution of CG in Nanjing relates to the particular socio-economic and cultural position of the city itself. Within China, Nanjing is a leading innovator in business and government collaborations. Nanjing has many active for-profit organisations, as well as open-minded government officials who are receptive to new collaborative concepts and who tend to take a more

progressive approach to DBSS governance. This has created an enabling environment for CG.

#### **4.4.1 Collaborative dynamics: the interaction between government and industry to solve DBSS issues in Nanjing, 2017-2020**

This section addresses RQ2 by providing insights into how government and industry representatives interacted to resolve DBSS issues in Nanjing. Three important dimensions defined the collaborative dynamics between government and industry: the capacity for joint actions, principled engagement, and shared motivations.

##### **4.4.1.1 Capacity for joint actions**

The capacity for joint actions by government and industry in governing Nanjing's DBSS was defined initially by a series of institutional arrangements, the most significant of which was the promulgation of the Guiding Opinion in July 2017. This Guiding Opinion clearly articulated a leadership structure and pre-established macro rules to guide CG regimes. Led at the city-level by three government departments (the Department of Transportation, the Traffic Police Bureau, and the Urban Administration Bureau), this structure produced unequal power dynamics between government and industry. Enterprises were sidelined during the decision-making process, and this impeded their ability to suggest innovative mechanisms for governing DBSS. An industry respondent noted, "We have a lot of good ideas on DBSS governance, but now we can only take orders from the government" (NJ-I-02).

While the Guiding Opinion established formal mechanisms to facilitate collaboration between government and industry, the dominance of government over industry within the CG was reinforced through a series of rules. These placed the government in control of the distribution of DBSS resources within the city, including the overall allowable fleet size of each enterprise, and a minimum ratio for the number of maintenance staff to the number of deployed bikes. In December 2017, the government established a six-monthly Performance Evaluation System for DBSS, rewarding good performance with an increase in the allowable fleet size, and mandating a decrease in fleet size for poor performance.

The governance structure established by the Guiding Opinion and evaluation system allowed government to provide key resources to industry, including political support, administrative assistance, funding, human resources, infrastructure, in-kind support, meeting spaces, and logistical support. A total of 33.4946 million yuan was invested in DBSS governance between 2017 and 2020 in Nanjing, with more than 1,500 parking slots for DBSS within the city. However, when collaborating with the all-encompassing government, there were incentives for industry to let the government take control and to comply with government requirements to reduce their overall costs.

Government and industry collaborative actions in Nanjing were influenced by peer engagement in knowledge-building activities carried out by both sectors. For example, during October and November of 2017, just before establishing the performance monitoring system in Nanjing, officials from the Urban Administration Bureau visited Beijing, Chengdu, Shenzhen, Suzhou and Changsha to learn about the advanced management policy practices used in those cities. The government also drew on

insights generated by university think tanks. Similarly, industry learned about innovative concepts and strategies, such as the technology-oriented CG model developed in the Qixia district through forming partnerships with leading international consulting firms, research institutes and private technology enterprises.

#### **4.4.1.2 Principled engagement**

The Guiding Opinion set the foundation for principled engagement between government and industry in Nanjing between 2017 and 2020. A balance between government leadership and the representation of industry interests was sought. Early interactions focused on negotiating individual and shared interests, concerns and values. For example, there was initially a clash of interests due to the government's aim to use DBSS to improve the public transport system and industry's objective to pursue profits. Yet both sectors realised they needed to compromise, and recognised their shared goal of ensuring the long-term, sustainable and ordered development of DBSS in Nanjing.

The collaboration matured over the years, with both sectors finding common purpose and objectives, such as the co-development of effective collaboration mechanisms and shared management policies. The responsibilities and obligations of the collaborators were clarified and differentiated. While the government was tasked with regulating the DBSS market, addressing road traffic, and planning and building infrastructure, industry was tasked with optimising product innovation and management mechanisms, as well as meeting the operational requirements of the regulating authorities.

Over time, diverse forums emerged for the thoughtful discussion of issues face-to-face or virtually through the telephone and WeChat. These forums provided a space for deliberation and negotiation processes oriented towards joint problem-solving, in which “all representatives had equal opportunities to talk, rather than imposing one’s position on others,” as one government official noted (NJ-G-03). These forums helped to facilitate a wide range of decisions, such as setting the agendas of regular meetings, enacting regulations, evaluation standards, management policies, all the way through to developing plans and assigning task groups for collaborative action.

However, the government often unilaterally determined goals or tasks for industry. As one industry respondent noted, “When [government] approach with the strong intent to promote...[a] ‘political task’ [zheng zhi ren wu], it is very hard for us to negotiate or refuse to accept these tasks, otherwise we would have been punished” (NJ-I-02). For instance, for Nanjing to maintain its position as a National Civilized City in 2019, the city government ordered the whole DBSS industry to replace old bikes with new ones to maintain the city’s civil appearance. This resulted in enterprises having to replace more than 100,000 old bikes within three months. As one industry respondent said during Hellobike’s public colloquium, “We had to accept government’s ‘[political] task,’ or we might...be asked to withdraw from the city.”

#### **4.4.1.3 Shared motivations**

The shared motivation for government and industry to engage in CG for DBSS in Nanjing was driven by mutual understanding, internal legitimacy and commitment, rather than by trust. It’s worth noting that a mutual understanding existed to some degree between government and industry in Nanjing given that government goals and

targets for DBSS were largely non-negotiable. One industry respondent noted, “We understood that we needed to respect government requirements to reduce risk and secure business opportunities” (NJ-C-02). The government required industry to sign a ‘responsibility letter’ [ze ren zhuang], a written commitment indicating intention to comply with government regulatory requirements and be wholly responsible for DBSS problems.

Between 2017 and 2020, this mutual understanding shifted as government and industry became familiar with each other. Government representatives realised that they could more effectively implement their policies if they modified them slightly in response to the needs of DBSS enterprises. This subtle shift in mutual understanding was due to increased levels of trust between government and industry, which enabled both sectors to move beyond their own personal, institutional and jurisdictional frames of reference. Yet these attempts to build trust within DBSS collaborations – rather than just mutual understanding – were often thwarted by the unilateral behaviour of the government and frequent turnover of government and industry personnel. The casual workers recruited for maintenance teams by industry were replaced every few days, for instance, and the tenure of district-level government officials in Nanjing was often less than three years, and in some cases only a few months. This caused instability and undermined the establishment of mutual trust over time.

Similarly, the motivation for government and industry to collaborate was sustained through a form of internal legitimacy built on compatible and interdependent interests, rather than on trust. This allowed higher levels of efficiency to be achieved within the DBSS in Nanjing, which in turn legitimised and motivated ongoing collaboration. One

government respondent noted, “Collaboration not only enables us to increase consensus and reduce conflicts, but also to combine public and private resources to achieve outcomes that are greater than the sums of our constituent parts” (NJ-G-01). This internal legitimacy has led to a shared commitment between government and industry. An industry respondent indicated, “Without collaboration, the governance condition of Nanjing’s DBSS would not achieve results as good as the ones it is achieving now” (NJ-I-02).

#### **4.4.2 Actions, outcomes and adaptations: the extent of improvement of Nanjing’s DBSS under CG frameworks between 2017-2020**

Our findings in response to RQ3 show that the collaborative dynamics discussed in the previous section propelled the collaborative actions between government and industry and their effectiveness and impact in Nanjing. The section to follow provides detailed insights into the last of the three key components of the Integrative Framework for Collaborative Governance: collaborative actions, outcomes and adaptations.

##### **4.4.2.1 Collaborative actions and outcomes**

Efforts by government and industry to achieve their shared goal of ensuring the long-term sustainability of DBSS in Nanjing were enabled through several collaborative actions, designed to encourage dialogue and collective management. Two examples of actions and their outcomes are discussed below.

The first example focuses on the formation of engagement mechanisms. Between mid-2017 and early 2018, the Qinhuai district government developed processes to enable



ongoing dialogue with industry. Government leaders sponsored a multi-round deliberation process with industry, leading to regular joint management meetings each week and month, and special brief meetings [peng tou hui] to jointly agree on DBSS management methods for public events and holidays. These engagement programs allowed stakeholders to become more familiar with one another, and to reveal individual concerns, ‘pain points,’ and common ground for collaboration. Participants highlighted that these deliberation processes provided a foundation for significant improvements in DBSS operations in each district. An industry representative pointed out the positive outcomes of this ongoing dialogue, saying, “Partnership has become better than it was in 2017: we have regular dialogue, sharing ideas, working together on problems, and operating in a mutually supportive and constructive relationship” (NJ-I-02).

The second example focuses on the establishment of joint management mechanisms. In 2018, the Qixia district government – in collaboration with industry – developed a technology-oriented management model that established a real-time digital platform to monitor the district’s DBSS operations. A centralised big data Monitoring Office staffed by ten government staff was established to monitor the district’s DBSS and provide guidance to 30 frontline industry maintenance staff. These measures enabled 24/7 management of the district’s DBSS. An industry respondent stated that “Qixia district’s street order has become better than it was in 2017” due to these management mechanisms (NJ-I-02). A government official also noted, “Currently, issues of bike congestion and disorderly parking...rarely happen, which is the most direct manifestation of the success of [the collaboration between government and industry]” (NJ-G-03).

#### **4.4.2.2 Adaptations**

One government official within Nanjing referred to the experience of engaging in the types of collaborative actions outlined above as “feeling the stones across the river” (NJ-G-03), an adaptive process that generated trust and new knowledge among stakeholders. An example of this adaptive potential is the gradual change in the balance of power and responsibilities of the CG of DBSS in Qixia district. This has resulted in the Qixia district government empowering industry to lead collaborative actions and develop policy change (such as Bluetooth Spike technology to build electronic fences to house the shared bikes), while the government maintains responsibility for providing advice and resources to support DBSS.

#### **4.5 Discussion and conclusion**

This study provides detailed insights into the diverse contextual factors and dynamics that guided government and industry engagement in the CG of Nanjing’s DBSS between 2017 and 2020. We have analysed the unique form of government-led CG that emerged within China’s urban centres to support and manage the growth of the bike-sharing economy.

Our research team found that the CG that developed between government and industry actors in Nanjing’s DBSS was strongly influenced by the tradition of a centralised government in China. This perpetuated a hierarchical distribution of power between stakeholders involved in DBSS collaborations in Nanjing, allowing government to

exert authority over industry. This finding is consistent with the findings of Davies (2011) on government hegemonies within CG of DBSS in other cities in China.

Similarly, Wang and Yin (2012) highlight that government officials in Zhejiang Province, China, saw themselves as natural leaders instead of equal collaborators, and private enterprises operated as invited assistants and supplicants to the government. As Jing et al. (2015) point out, China's private enterprises are understood to be vehicles for the effective implementation of the government's requirements. Our study supports the findings reported by Wang et al. (2020) of policymakers' ideology and competition pressure of political performance being key drivers in initiating the CG of DBSS in Nanjing, but our study includes uncertainty and interdependence as further key drivers of CG of Nanjing's DBSS.

We have also provided insights into the dynamics – capacity for joint actions, principled engagement, and shared motivations – underpinning CG of DBSS in Nanjing. Our findings support those reported by other researchers (Hong, 2018; Mikwamba et al., 2020), affirming that government can play a vital role in initiating CG by implementing guidelines that clearly articulate a leadership structure, and by pre-establishing rules as the foundations for principled engagement and collaborative actions. Our research findings are also consistent with the observation by Jing et al. (2015) that a fair and inclusive collaboration is only possible when governments do not have to compromise on their objectives in China (Wang and Yin, 2012; Wang et al., 2019).

The government objectives discussed in this study are considered political tasks in the Chinese context. Wang and Chen (2020) observe that the Chinese bureaucracy pits performance against political tasks as the key means of evaluating government officials and government progress (Guo, 2007; Gao, 2009; Zhou, 2010; Zhu, 2017; Wang et al., 2020b; Wu and Zhang, 2022). In keeping with the findings by Saich (2000) and others (Montinola et al., 1995), our study shows that the ability to sustain a private business in China depends on the ability of industry to link their goals to those of government, and thus ensure their business is treated favourably by officials. Loyalty to political tasks is therefore key to CG in China (Montinola et al., 1995). As Jing et al. (2015) note, the type of CG described in this study – with its heavy administrative intervention from Chinese local governments – is not well-aligned with much of the CG theory emanating from Western contexts. The latter tends to emphasise the importance of equal partnerships and minimal intervention from authorities as guiding principles (Huxham, 2005; Ansell and Gash, 2008; Emerson and Nabatchi, 2015).

Our study confirms that the authoritarian style of principled engagement guiding CG of DBSS in Nanjing helped to cultivate a particular form of shared motivation that was strongly influenced by mutual understanding, internal legitimacy and commitment, rather than by trust. These findings align with those of Van Eijk and Gascó (2018), who note that the motivation for collaboration between government and industry may emanate from their mutual awareness of the interdependence of political and financial resources, rather than from trust (see also Wang and Yin, 2012).

We have shown that the power dynamics between government and industry in Nanjing shifted and matured over time to generate numerous collaborative actions and outcomes. This suggests that a centralised collaboration model, such as the one that guided the development and management of DBSS in Nanjing, can sometimes make it easier to implement collaborative actions (and improve the outcomes of those actions). As some studies (Provan and Milward, 1995; Jing, 2015; Wang et al., 2020b) have already noted, the strong centralised government control over the collaboration models used to govern DBSS in China's major cities provides significant political and financial resources. However, in contrast to the findings reported by Ma et al. (2018) on DBSS collaborations in Shanghai, we found the CG of Nanjing's DBSS to be mostly adaptive.

Future research could expand on this study's examination of government and industry engagement in the CG of DBSS in Nanjing by generating insights into the roles that other stakeholders – including academics, social organisations and users – play in Nanjing's DBSS. Furthermore, while this study has demonstrated the applicability of the Integrative Framework for Collaborative Governance as a means of analysing the CG of DBSS within a Chinese context, our findings show that some of the assumptions about CG in much of the current literature, such as Espinoza (2017) and Berends et al. (2016), are founded predominantly on the study of CG in Western contexts. As a result, those insights about CG are not directly applicable to places with different historical and institutional foundations, such as China. As Jing et al. (2015) highlight, further studies are needed to document the unique and shared characteristics of CG across diverse cultures.

Finally, our study has practical implications for the policy and practice of China's urban governance in a growing sharing economy. Our findings highlight the advantages of China's local governments playing a lead role in collaborative processes of urban governance, namely their ability to rapidly mobilise access to administrative and financial resources. Such rapid mobilisation can be of benefit when China's local governments and industry need to work urgently together to resolve a crisis, such as China's community governance during pandemics, or urban water governance (Wang and Chen, 2020) through natural resource management (Wei, 2022) during water shortages.

We have also highlighted the potential negative impacts of this form of government-led CG, such as stifling incentives for innovation by industry actors within the sharing economy. However, our findings reveal that the CG of DBSS in Nanjing led to the gradual transformation and improvement of the partnership between local government and industry, from centralised power towards a more distributed balance of power. We thus suggest government-industry collaboration in urban governance not only encourages private sector participation in civil society in China, but also accelerates the modernisation and sustainability of China's governance systems.

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## References

- Ansell, C. & Gash, A. (2008). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research & Theory*, 18, 543-571.
- Bentrup, G. (2001). Evaluation of a collaborative model: a case study analysis of watershed planning in the Intermountain West. *Environmental management*, 27 (5), 739-748.
- Berends, L., Ritter, A. & Chalmers, J. (2016). Collaborative Governance in the Reform of Western Australia's Alcohol and Other Drug Sector: Reform of WA Alcohol and Other Drug Sector. *Australian journal of public administration*, 75 (2), 137-148.
- Bryson, J.M., Crosby, B.C. & Stone, M.M. (2006). The Design and Implementation of Cross-Sector Collaborations: Propositions from the Literature. *Public Administration Review*, 66 (s1), 44-55.
- Cao, J., Prior, J. & Moutou, C. (2021). The governance of dockless bike-sharing schemes: A systemic review of peer-reviewed academic journal papers between 2016 and 2019. *Cleaner Engineering and Technology*, 4, 100140.
- Chen, R. (2019). "Bike litter" and obligations of the platform operators: Lessons from China's dockless sharing bikes. *The computer law and security report*, 35 (5), 105317.
- Creswell, J.W. (2007). *Qualitative inquiry and research design : choosing among five approaches* (2nd ed.). Thousand Oaks, California: Sage Publications.
- Creswell, J.W. (2009). *Research design : qualitative, quantitative, and mixed methods approaches* (3rd ed.). Thousand Oaks, California: Sage Publications.
- Creswell, J.W. (2013). *Qualitative inquiry and research design : choosing among five approaches*(3rd ed.). Thousand Oaks, California: Sage Publications.
- Davies, J.S. (2011). *Challenging governance theory From networks to hegemony*. Bristol, England: Policy Press.
- Emerson, K. & Nabatchi, T. (2015). *Collaborative Governance Regimes*. Washington, DC: Georgetown University Press.
- Emerson, K., Nabatchi, T. & Balogh, S. (2012). An Integrative Framework for Collaborative Governance. *Journal of Public Administration Research & Theory*, 22 (1), 1-29.



- Espinoza, A. (2017). California High-Speed Rail Project: Assessing Regional Differences Regarding the System Context and Collaboration Dynamics. Dissertation, The University of La Verne.
- Gao, J. (2009). Governing by goals and numbers: A case study in the use of performance measurement to build state capacity in China. *Public administration and development*, 29 (1), 21-31.
- Guo, G. (2007). Retrospective Economic Accountability under Authoritarianism: Evidence from China. *Political research quarterly*, 60 (3), 378-390.
- Guo, P., Lin, X.Z., Huang, Y., Tu, S.M., Bai, X.M., Yang, Y.W. & Ye, L. (2017). Sharing bike: collaborative governance in Internet technology and public services. *Journal of Public Management*, 14, 1-10. [In Chinese]
- Hamari, J., Sjöklint, M. & Ukkonen, A. (2016). The sharing economy: Why people participate in collaborative consumption. *Journal of the Association for Information Science & Technology*, 67 (9), 2047-2059.
- Han, S.S. (2020). Co-producing an urban mobility service? The role of actors, policies, and technology in the boom and bust of dockless bike-sharing programmes. *International Journal of Urban Sustainable Development*, 14 (1), 1-16.
- Hong, M. (2018). Public university governance in China and Australia: a comparative study. *Higher education*, 76, 717-733.
- Huxham, C. (2005). *Managing to collaborate : the theory and practice of collaborative advantage* (1st ed.). London, England: Routledge.
- Jia, L., Liu, X. & Liu, Y. (2018). Impact of Different Stakeholders of Bike-Sharing Industry on Users' Intention of Civilized Use of Bike-Sharing. *Sustainability*, 10 (5), 1437.
- Jin, J. & Bian, S.J. (2018). The cooperative governance route of urban shared bicycle based on stakeholder perspective: a case study of Nanjing, Jiangsu province. *Urban Development Studies*, 25, 92-99. [In Chinese]
- Jing, Y. (2015). Introduction: The Road to Collaborative Governance in China. In: Y. Jing (ed.). *The Road to Collaborative Governance in China*. New York City: Palgrave Macmillan.
- Jing, Y., Cui, Y. & Li, D. (2015). The politics of performance measurement in China. *Policy & society*, 34 (1), 49-61.

- Klijin, E.-H. (2012). Governance network theory: past, present and future. *Policy & Politics*, 40 (4), 587-606.
- Koschmann, M.A., Kuhn, T.R. & Pfarrer, M.D. (2012). A Communicative Framework of Value in Cross-Sector Partnerships. *Academy of Management Review*, 37 (3), 332-354.
- Lan, J., Ma, Y., Zhu, D., Mangalagiu, D. & Thornton, F.T. (2017). Enabling Value Co-Creation in the Sharing Economy: The Case of Mobike. *Sustainability*, 9 (9), 1504.
- Liu, Z. (2020). Collaborative governance for responsible innovation in the context of sharing economy: studies on the shared bicycle sector in China. *Journal of open innovation*, 6 (2), 1-14.
- Ma, Y., Lan, J., Thornton, T., Mangalagiu, D. & Zhu, D.J. (2018). Challenges of collaborative governance in the sharing economy: The case of free-floating bike sharing in Shanghai. *Journal of Cleaner Production*, 197, 356-365.
- Mikwamba, K., Dessein, J., Kambewa, D., Messely, L. & Strong, R. (2020). Collaborative governance dynamics in innovation platforms: case of Malawi's District Stakeholder Panel. *The journal of agricultural education and extension*, 27 (2), 1-21.
- Montinola, G., Qian, Y. & Weingast, B.R. (1995). Federalism, Chinese Style: The Political Basis for Economic Success in China. *World politics*, 48 (1), 50-81.
- Provan, K.G. & Milward, H.B. (1995). A Preliminary Theory of Interorganizational Network Effectiveness: A Comparative Study of Four Community Mental Health Systems. *Administrative science quarterly*, 40 (1), 1-33.
- Qin, Z. & Wang, Q. (2017). Synergy mechanism in the vision of sharing economy: taking shared bikes for example. *Reform*, 30, 124-134. [In Chinese]
- Ring, P.S. & Van De Ven, A.H. (1994). Developmental processes of cooperative interorganizational relationships. *The Academy of Management Review*, 19 (1), 90-118.
- Saich, T. (2000). Negotiating the State: The Development of Social Organizations in China. *The China quarterly*, 161, 124-141.
- Seidman, I. (2019). *Interviewing as qualitative research : a guide for researchers in education and the social sciences (5th ed.)*. New York City: Teachers College Press.

- Selin, S. & Chevez, D. (1995). Developing a collaborative model for environmental planning and management. *Environmental management*, 19, 189-195.
- Shi, J.-G., Si, H., Wu, G., Su, Y. & Lan, J. (2018). Critical Factors to Achieve Dockless Bike-Sharing Sustainability in China: A Stakeholder-Oriented Network Perspective. *Sustainability*, 10 (6), 2090.
- Sun, Y.Y. (2018). Sharing and Riding: How the Dockless Bike Sharing Scheme in China Shapes the City. *Urban Science*, 2 (3), 68-68.
- Van Eijk, C. & Gascó, M. (2018). Unravelling the Co-Producers: Who are They and What Motivations do They Have?. In: VE. Carola (ed.). Oxfordshire, England: Routledge.
- Wang, F. & Yin, H. (2012). A New Form of Governance or the Reunion of the Government and Business Sector? A Case Analysis of the Collaborative Natural Disaster Insurance System in the Zhejiang Province of China. *International public management journal*, 15 (4), 429-453.
- Wang, H., Chen, B., Xiong, W., Yang, L. & Zhu, D. (2019). Multiple Pathways to Public-Private Partnerships for Urban Public Service Delivery: A Cross-City Comparison of Bicycle-Sharing Service in China. *Urban Policy and Research*, 37 (4), 1-15.
- Wang, H., Cheng, Z. & Zhu, D. (2020). Striving for global cities with governance approach in transitional China: Case study of Shanghai. *Land use policy*, 90, 104288.
- Wang, H., Xiong, W., Yang, L., Zhu, D. & Cheng, Z. (2020). How does public-private collaboration reinvent? A comparative analysis of urban bicycle-sharing policy diffusion in China. *Cities*, 96 (4), 102429.
- Wang, J., Huang, J. & Dunford, M. (2019). Rethinking the Utility of Public Bicycles: The Development and Challenges of Station-Less Bike Sharing in China. *Sustainability*, 11 (6), 1539-1539.
- Wang, Y. & Chen, X. (2020). River chief system as a collaborative water governance approach in China. *International journal of water resources development*, 36 (4), 610-630.
- Wei, S. (2022). The Collaborative Governance Between Public and Private Companies to Address Climate Issues to Foster Environmental Performance: Do Environmental Innovation Resistance and Environmental Law Matter? *Frontiers in psychology*, 13, 2022.

- Wu, F. & Zhang, F. (2022). Rethinking China's urban governance: The role of the state in neighbourhoods, cities and regions. *Progress in human geography*, 46 (3), 775-797.
- Yeung, H.W.-C. (2009). Regional Development and the Competitive Dynamics of Global Production Networks: An East Asian Perspective. *Regional studies*, 43 (3), 325-351.
- Yin, J., Qian, L. & Shen, J. (2019). From value co-creation to value co-destruction? The case of dockless bike sharing in China. *Transportation Research Part D Transport and Environment*, 71, 169-185.
- Yin, R.K. (1994). *Case study research : design and methods* (2nd ed.). Thousand Oaks, California: Sage Publications.
- Yin, R.K. (2014). *Case study research : design and methods* (5th ed.). Thousand Oaks, California: Sage Publications.
- Zhang, X., Shen, Y. & Zhao, J. (2021). The mobility pattern of dockless bike sharing: A four-month study in Singapore. *Transportation research. Part D, Transport and environment*, 98, 102961.
- Zheng, W.W. & Chen, J.P. (2018). Cooperative network governance: selection of governance mode and optimization countermeasures for bike-sharing. *E-Government*, 15, 61-67.
- Zhou, X. (2010). The Institutional Logic of Collusion Among Local Governments in China. *Modern China*, 36 (1), 47-78.
- Zhu, X. (2017). Inter-regional diffusion of policy innovation in China: A comparative case study. *Asian journal of political scienc*, 25 (3), 266-286.

# Chapter 5: Sydney case findings

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## Paper preface

This chapter includes a re-formatted, co-authored peer-reviewed paper. The full citation for the paper, including all authors, is as follows:

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## Statement of contribution

Jun Cao mainly contributed to the ideas contained in this paper. Jun Cao collected the data and wrote the manuscript. Jason Prior supervised the overall work and polished the wording of this paper. Damien Giurco provided constructive advice to improve the manuscript.

## Research highlights

1. Providing insights into how key DBSS stakeholders collaborate through a case study of government and industry interactions in Sydney's DBSS from 2017 to 2020.

2. Adopting and applying the Integrative Framework for Collaborative Governance as a theoretical tool, and carrying out qualitative analysis of policies and interviews with government and industry staff.
3. Highlighting the advantages of local governments playing a lead role in collaborative urban governance processes (such as being able to rapidly mobilise administrative and financial resources).
4. Highlighting the potential negative impacts of this form of government-led CG (such as stifling incentives for innovation by the DBSS industry).

Article

# Government and Private Company Collaboration in the Governance of Shared Mobility Schemes: A Case Study of Dockless Bike-Sharing Schemes in Sydney, Australia

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## Abstract

While a growing body of studies has investigated the collaborative governance (CG) of dockless bike-sharing schemes (DBSS) worldwide, few offer close description and analysis of stakeholder interactions in specific social contexts. Our study fills this gap by examining the development of CG of DBSS in Sydney, Australia between 2017 and 2020. The methodology is guided by an Integrative Framework for Collaborative Governance, drawing on qualitative analysis of policy documentation and semi-structured interviews with key DBSS participants from the public and private sector. Our findings reveal context-specific drivers and dynamics that shaped the development of particular forms of CG within Sydney's DBSS.

## Keywords

Shared mobility schemes; Dockless bike-sharing schemes; Public-private collaboration; Integrative Framework for Collaborative Governance; Governance

## 5.1 Introduction

In recent years, the surge of innovations and entrepreneurship categorised under the umbrella term the “sharing economy” has made a broad range of urban public services increasingly accessible (Hamari et al., 2016). The idea of a “sharing city” is integral to many visions of urban futures, opening up new possibilities and pathways toward more sustainable cities (Agyeman and McLaren, 2017). A city organised around the value of “sharing” instead of “owning” has the potential to boost resource use efficiency.

A key component of many sharing economies in urban centres around the world is bike-sharing schemes (BSS). This type of shared-use mobility initiative was first commercialised in Amsterdam in 1965 (DeMaio, 2009). In more recent years, GPS- and smartphone-enabled dockless bike-sharing schemes (DBSS) have spread worldwide, starting in China in 2015 (Shi et al., 2018; Yin et al., 2019). These schemes do not require bikes to be collected or deposited in docking stations (as they had been in the majority of bike-sharing programs) (Shaheen et al., 2010; Faghih-Imani and Eluru, 2015). Instead, bikes can be rented from a variety of urban locations at the user’s convenience by scanning a Quick Response (QR) code on each bike, and the bike can be dropped off anywhere once the user’s trip is completed (Jia et al., 2018; Ma et al., 2018; Wang et al., 2020b). It has been reported that DBSS are cheaper, more flexible and provide easier access to bikes than docked BSS (Sun, 2018). DBSS also provide an effective way of meeting ‘the last mile’ travel demand (Zhao and Wang, 2019).



Nevertheless, DBSS are not perfect and their implementation presents significant challenges, particularly in terms of urban governance. Users sometimes dump or illegally park bikes in public spaces (Guo et al., 2017), disrupting traffic, creating hazards for pedestrians and affecting urban aesthetics (Zhao and Wang, 2019). In their initial response, some local governments in Australia impounded misplaced bikes, while the City of Melbourne went even further and announced a ban on DBSS in 2017 (Chen, 2019). These fairly extreme early measures triggered fierce public criticism of government authorities for not supporting transport-sharing schemes in the public interest and for being averse to innovation. A more considered and sophisticated solution has emerged more recently in the form of collaborative governance (CG) between government actors and private DBSS enterprises (Guo et al., 2017; Qin and Wang, 2017; Ma et al., 2018). CG is a term used to refer generally to cross-boundary collaboration between the public and private sectors in co-managing public programs or resources (Ansell and Gash, 2008). Although some scholars (Huxham and Vangen, 2000; Wang et al., 2020) have noted that the collaboration between multiple actors may make the decision-making process complicated, cross-sectoral collaboration can help to establish reciprocal and trust-based relations and reduce conflict (Jing and Li, 2019).

Since 2017, some published research within this field has focused on the conceptual analysis of CG of DBSS (Cao et al., 2021). However, a close inspection of this literature reveals a significant research gap. There are few empirical studies examining the

dynamic engagement process among DBSS stakeholders from both the government and private enterprises in particular cities, and little in-depth examination of the diverse, context-specific factors influencing policy and governance decision-making. Our research addresses this identified gap by presenting case studies of the dynamic interactions between two major stakeholder groups – government, and private DBSS enterprises – within the CG framework of DBSS in different cities. We have recently published our research on local government and private enterprise interactions in DBSS of Nanjing (Cao et al., 2022), and the present paper focuses on the city of Sydney between 2017 and 2020. The Sydney study is of particular interest because CG was actively incorporated into the policy framework guiding the development of DBSS in Sydney (Jin and Bian, 2018; Ma et al., 2018).

Our research methods for the Nanjing study (Cao et al., 2022b) and the Sydney study are essentially the same. They include analysis of policy documents, in-depth semi-structured interviews with representatives from local governments, private DBSS enterprises and academic institutions, and participation in multiple stakeholder symposia. More broadly, our approach adopts the Integrative Framework for Collaborative Governance of Emerson et al. (2012), a comprehensive tool that can be used to delineate and understand CG models in any urban context. In the Sydney study, we use this framework to explore the impact of certain factors – such as trust-building and equal engagement of government and corporate actors – on the CG of the city's DBSS. Our findings are potentially of use to industry practitioners, planners,

policymakers and scholars involved in the sustainable development of DBSS in urban centres worldwide.

This paper begins by describing the conceptual framework used to guide our empirical case study (Section 2). Section 3 describes the rationale for our research methods and data selection. We present our research results in Section 4, and in Section 5 (Discussion and conclusion) we compare our research outcomes with prior studies of DBSS, point to new directions for future research, and acknowledge the study's limitations.

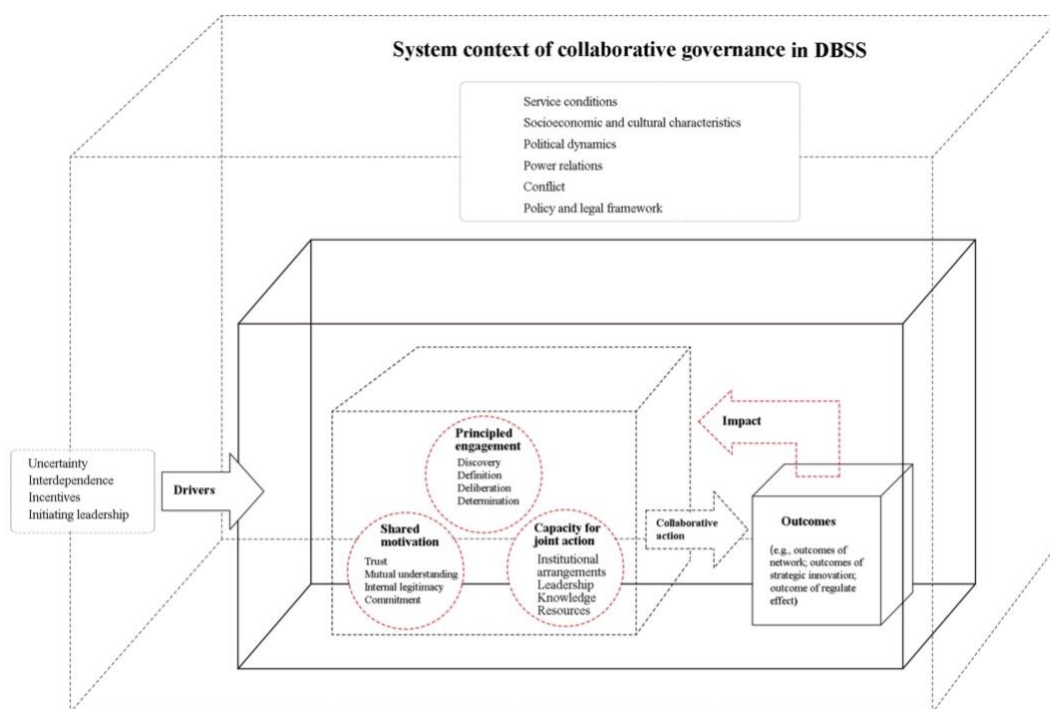
## **5.2 Conceptual framework for analysing CG of Sydney's DBSS**

In recent decades, several theoretical and analytical models have emerged that seek to conceptualise emerging CG practices across the world (Ring and Van de Ven, 1994; Selin and Chevez, 1995; Bryson et al., 2006; Ansell and Gash, 2008; Koschmann et al., 2012), including the CG of DBSS (Guo et al., 2017; Qin and Wang, 2017; Gao and Li, 2018). For example, Gao and Li (2018) used Ansell and Gash (2008)'s Collaborative Governance Model to examine governance issues related to CG in DBSS of China's cities, including conflicts of interest between government and private DBSS enterprises, and policy-making processes of DBSS. They highlighted the lack of inclusiveness in the policy-making process of DBSS in Chinese cities. Guo et al. (2017) designed a Collaborative Governance Framework for DBSS, and discussed the

practical applicability of the cross-sector collaboration approach in solving DBSS governance issues in a Chinese context. They argued that China's local governments should be transformed from 'controllers' to 'guiders' in governance processes of DBSS. Qin and Wang (2017) further discussed the responsibilities and obligations of the government, private DBSS enterprises, and local residents in the CG of DBSS through establishing a Tripartite Collaboration Model for DBSS. Wang et al. (2020) adopted the Public-Private Collaboration Framework to explore the positive impact of public and private collaboration on DBSS's policy diffusion in China's cities. While these frameworks are useful at a broad theoretical level, not all of them are easily applicable across different geographical and institutional settings, and few pay close attention to contextual analysis or the dynamics between multiple actors within a CG, which are key focuses of our research.

In our broader research, and in this study, we have used Emerson et al. (2012)'s Integrative Framework for Collaborative Governance (Figure 20) to guide our research methodology, for two reasons. Firstly, it has been widely adopted by scholars and repeatedly tested in empirical CG studies (Berends et al., 2016; Ma et al., 2018; Cao et al., 2022) to conceptualise interaction among multiple actors, such as government, private organisations, and users. For example, Ma et al. (2018) partly used this framework to examine social participation in addressing governance issues of Shanghai's DBSS between 2017 - 2018. Secondly, the Integrative Framework provides effective tools for comparative research across various social contexts, as it emphasises

the way in which context-specific factors are important in any examination of collaborative governance in action (Ma et al., 2018).



**Figure 20** Integrative Framework for Collaborative Governance. Source: By author, adapted from Emerson and Nabatchi (2015).

Our case study draws on the Integrative Framework to understand how local governments and enterprises have dynamically interacted in the governance of DBSS in Sydney since 2017 by tracking the impact of the following elements:

- System context and drivers, which may have improved or hindered the engagement of local governments and private DBSS enterprises in the CG of DBSS in Sydney (Figure 20);

- Collaborative governance regime, which encompasses “the particular mode of, or system for, public decision making in which CG represents the prevailing pattern of behaviour and activity” (Emerson et al., 2012). Being able to describe the collaborative dynamics that constitute and sustain any CG regime is essential to understanding it;
- Collaborative dynamics, which can be further divided into three cyclical and nonlinear sub-variables: principled engagement, shared motivation, and capacity for joint action. These collaborative dynamics led to joint actions aimed at making progress toward the common goals of the CG of DBSS in Sydney (Figure 20);
- Outcomes, which are the external effects of the joint actions taken by government and private DBSS enterprises, alongside any necessary adaptations. These outcomes and adaptations include: innovations in collaboration mechanisms, and new management policies that promote or constrain the success and long-term development of any CG models.

We developed three research questions based on the theoretical elements of the Integrative Framework, as outlined below.

- RQ1 (system context and drivers): How did Sydney’s system context and drivers influence the CG of Sydney’s DBSS?

- RQ2 (collaborative dynamics): How did local governments and private DBSS enterprises dynamically interact in the governance of Sydney’s DBSS?
- RQ3 (collaborative actions, outcomes, and adaptations): What collaborative actions were carried out by local governments and private DBSS enterprises during the collaboration? What outcomes and adaptations have arisen from these actions?

### **5.3 Research methods**

This study developed a qualitative case study strategy to respond to our three research questions. Case studies have been widely used in urban studies (Qiao, 2016), facilitating research in which the “holistic and meaningful characteristics of real-live events” are retained (Yin, 1994). This approach also allows researchers to focus on particular individuals, groups or institutions, and to provide a picture of complex interactions between different actors with non-aligned interests and ideas about acceptable solutions (Klijn, 2012).

#### **5.3.1 Case selection and case study context**

Based on the requirements of our case study strategy, we chose to focus in this paper on only one urban DBSS program. In selecting the Sydney DBBS program, we were guided by three key criteria:

- The DBSS had been operating for at least one year.

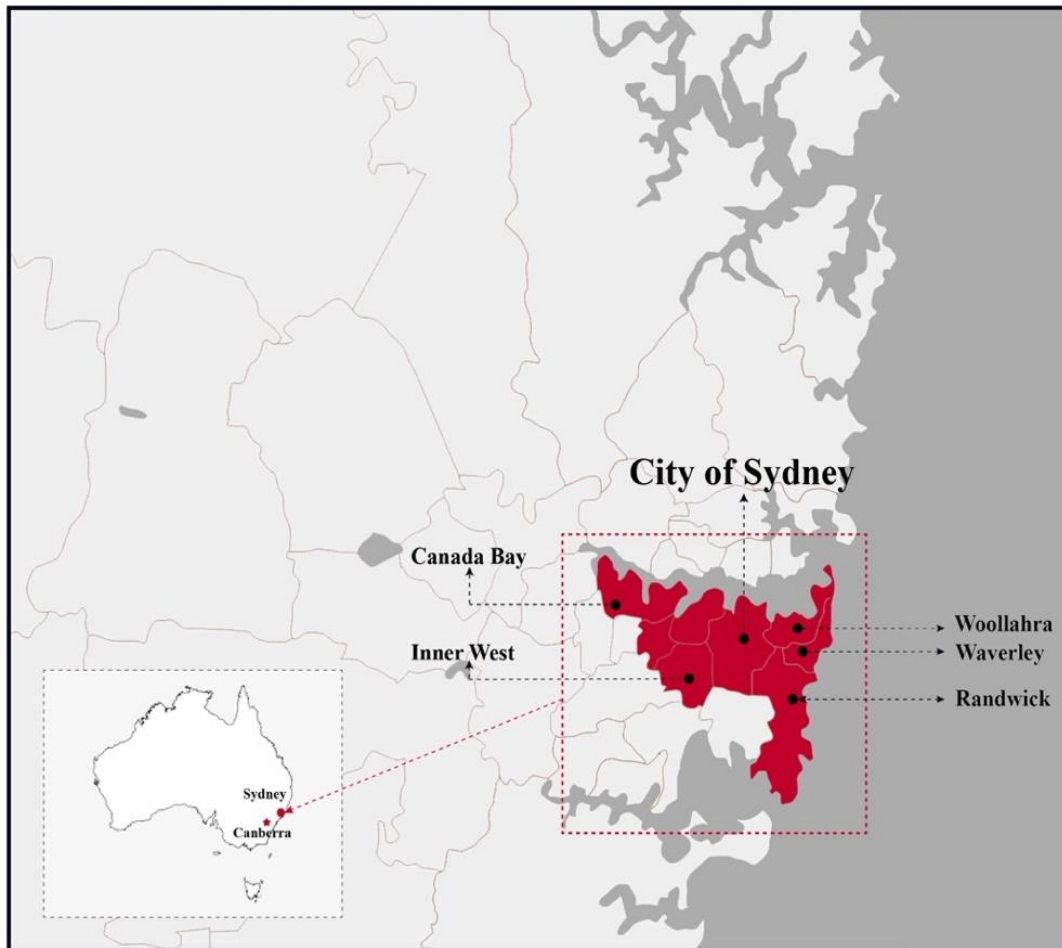
- The city had begun to regulate the DBSS and had some features of cross-sector collaboration.
- The research team had strong local contacts, allowing for access to targeted interviewees.

The data we gathered to develop these criteria was mainly sourced from prior academic literature. Although many Australian cities did fit these selection criteria, Sydney was the most suitable city for our study for several reasons. Firstly, Sydney was one of the first cities within Australia to launch DBSS. Secondly, Sydney's DBSS had incorporated CG elements from the start of its governance and policy design. Thirdly, the research team could tap into their local social network in Sydney, especially among local governments, private DBSS enterprises, and universities and think tanks.

Sydney is the capital city of New South Wales (NSW) and the largest city in Australia (Dowling and Kent, 2015) (See Table 21). Sydney launched its first DBSS fleet in 2017 (Heymes and Levinson, 2018). By the end of 2017, five private DBSS enterprises were in operation, with more than 10,000 shared bikes across the metropolitan area. These DBSS quickly became a popular transport alternative in a relatively car-dominated city. In response, six local governments – Waverley, the Inner West, City of Sydney, Randwick, Woollahra, and Canada Bay – formed a Sydney Local Government Alliance



and began collaborating actively with industry to devise a governance framework from December 2017.



**Figure 21** Location of Sydney within Australia (local government areas marked in red are the focus of this case study). Source: By author.

**Table 13** Background information about Sydney’s various DBSS (based on 2020 statistics)

<b>Population (million)</b>	4.4
<b>Area (km<sup>2</sup>)</b>	12,367.7
<b>Number of local councils</b>	31
<b>Number of shared bikes</b>	15,000
<b>Number of private DBSS enterprises</b>	3 (Lime, Jump, Onyahbike)

### **5.3.2 Methods of data collection and analysis**

In the first stage, we collected archival data and contextual materials in relation to the operation and management of DBSS in Sydney, including any relevant laws or policies, collaboration memoranda, and websites of local governments and DBSS enterprises.

In the second stage, we carried out fieldwork to collect primary data through in-depth, semi-structured interviews with important participants involved in the CG of Sydney's DBSS. In total, 10 interviews with key participants in Sydney's DBSS were conducted between September 2020 and January 2021. The interviewees include:

- One senior transport planner in the transport sector of the NSW State Government;
- Three managers of cycling strategy teams within participating local councils;
- One founder of a DBSS enterprise;
- One regional head of government relations within a DBSS enterprise;
- Two general managers of DBSS enterprises;
- Two researchers from think tanks specialising in transportation planning.

Interviewees were selected based on their experience of participating directly in governing DBSS in Sydney. Interview questions were designed to address our study's

three core research questions. Before each interview, the lead researcher gathered information about the key DBSS activities carried out by each interviewee's department or organisation, allowing the interview questions to be customised to the interviewee's particular involvement in the DBSS. Owing to the COVID-19 pandemic, face-to-face interviews were not allowed, so we used telephone and online (ZOOM) interviews.

To provide further data on Sydney's DBSS, we visited the offices of Sydney's DBSS enterprises, including Mobike (the prior name of Meituan Bike) and Lime in early 2020, and also attended two online symposia in the second half of 2020 through VooV Meeting. The first symposium, organised by Southeast University in August 2020, was attended by scholars from universities in the United States, Australia and China. The focus was on innovations in government regulatory mechanisms in managing and supporting DBSS across the world, including in Australia. The second symposium was organised by Meituan Bike in October 2020, and the participants included scholars and overseas team leaders. The focus was on the development of Meituan Bike in China's cities and overseas markets, including the Sydney market, and how their overseas management teams collaborated with local governments.

All relevant data collection was carried out by one lead researcher guided by an expert research team. Documents, interview transcripts and notes from the symposia were

subsequently analysed and summarised through a thematic coding method introduced by Yin (1994). The coding process included five steps:

1. The data was prepared and organised using Excel;
2. We chose “prefigured” codes according to the theoretical variables of the Integrative Framework (e.g., collaborative dynamics and drivers, principal engagement, institutional arrangements);
3. Axial coding was used to construct linkages between the concepts and the data and adequately explore the relationships between the concepts and categories (Wang et al., 2020);
4. The key concepts were linked through selective coding;
5. The data was interpreted in relation to our research goals and questions (Creswell, 2014).

To maintain the anonymity of those interviewed for the Sydney case study, each interviewee has a code identity in the format of ‘city – organisational type – numbering’ (such as ‘SYD’, ‘G-01’, ‘C-01’ and ‘A-01’) as outlined in Table 14 below. In this coding system, ‘SYD’ stands for Sydney, ‘G’ for government departments, ‘C’ for DBSS enterprises, and ‘A’ for academia.

**Table 14** List of interviewees in Sydney

<b>Code</b>	<b>Organisation</b>	<b>Position</b>
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SYD-G-01; SYD-G-02; SYD-G-03; SYD-G-04	NSW State Government and local governments	Senior managers
SYD-C-01; SYD-C-02; SYD-C-03; SYD-C-04	DBSS enterprises	Senior managers (government relations/general managers/founder)
SYD-A-02	Research institution and university think tank	Researchers

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## 5.4 Results

Based on the empirical data we collected, the results (organised in response to our research questions) are presented in the following sections.

### 5.4.1 Initiating and developing the CG of DBSS in Sydney (system contexts, including drivers)

In response to RQ1, this section discusses Sydney's system context and how it defined the style of CG of Sydney's DBSS that emerged between local governments and private enterprises between 2017 and 2020.

In July 2017, an Australian DBSS enterprise called Reddy Go launched its first DBSS fleet in the City of Sydney. Within a short time, this DBSS expanded operations to include all of Sydney's major urban areas. Most local governments initially supported the DBSS, believing this model of bike-sharing could fill existing gaps in short-distance travel options offered to citizens, and thus could be a good option for the 'last mile' of

public transport, with associated benefits of reducing pollution, congestion and travel costs (SYD-G-01).

While local governments were cautiously supportive of Sydney's DBSS, there was still considerable uncertainty about DBSS governance and regulation within government and industry circles. Unlike Melbourne or other Australian cities, Sydney was unusual in that it did not have any existing (docked) bike-sharing programs before the arrival of the dockless versions that rapidly became popular. Local governments thus lacked governance experience in all forms of bike-sharing schemes, let alone in the new DBSS. As one government official noted, "We really want to control the DBSS market, but we don't know how to do it...we don't [even] know which department should be responsible for DBSS" (SYD-G-02).

A second complicating factor was that most of the DBSS start-ups that set up operations in Sydney (following the lead of Reddy Go) had headquarters overseas, for instance in China or the U.S., and as a result had limited knowledge of operating a DBSS under local conditions in Sydney. As one DBSS enterprise manager explained, "Sydney is unfamiliar to us. It is a vast and sparsely populated city, the operation cost of DBSS in Sydney was beyond our imagination, and we even didn't know how many maintenance staff we needed and how fast we needed to redistribute bikes for citizens" (SYD-C-01).

During this early period of uncertainty, some local governments and DBSS enterprises in Sydney began to take up adversarial positions in response to the vandalism, dumping, and inefficient maintenance of bikes. For example, some government leaders started accusing DBSS enterprises of failing to do enough to “lift their game” (SYD-G-03), and some local governments (such as the Inner West Council) began to implement more drastic measures, such as deploying staff to impound damaged and abandoned bikes, and charging DBSS companies expensive fines for their return.

In protest against these fines, which the enterprises considered to be prohibitively high, DBSS companies refused to pay the fines or to redeem their bikes. Waverley Council (which is the local government authority for the famous Bondi Beach, among other eastern suburbs of Sydney) said it impounded 107 bikes abandoned in their jurisdiction, but only two enterprises paid fines to retrieve 60 of these bikes, leaving 47 unclaimed. This fairly extreme management approach increased costs both for Sydney’s local governments and for DBSS enterprises. One government official explained that “to impound dump[ed] bikes, our frontline staff are having to run around and look at illegal bikes, [and] that is costly for us” (SYD-G-02). Furthermore, as one DBSS enterprise manager noted, “Paying an expensive fine can make operating costs prohibitive” (SYD-C-02).

Over time, however, local governments and DBSS enterprises in Sydney began to develop a pragmatic understanding that, to be effective, the governance of DBSS needed to be more collaborative, and they sought to develop jointly a more sustainable approach to supporting DBSS across the city. As one DBSS enterprise manager explained, “When we work[ed] closely with each other, the opportunity for DBSS to work [well] was far greater” (SYD-C-01). This emerging evidence of the value of government and organisational collaboration led to the continued use of dialogue in developing a CG model.

In July 2017, the Reddy Go enterprise and the City of Sydney Council initiated the first CG model for DBSS in Sydney. Soon afterwards, an alliance of six Sydney councils – Waverley, the Inner West, City of Sydney, Randwick, Woollahra, and Canada Bay – was established to collaborate with DBSS enterprises in devising a municipal-level governance framework called the Inner Sydney Bike Share Guidelines (the Guide), which took effect from December 2017. By the end of 2018, the last private partner – Lime enterprise – had also joined this alliance.

The CG regime of Sydney’s DBSS was directly influenced by the city’s cultural, political and socio-economic context. The private ownership and management of various DBSS was seen as welcome and legitimate in an open ‘free market,’ as long as these enterprises’ operations did not impinge on public amenities (SYD-G-02). As one



government official affirmed, “We do not make lots of red tape, nor make it difficult for DBSS enterprises to operate” (SYD-G-01). This philosophy of governance provided an enabling environment for DBSS enterprises.

Moreover, public-private collaborations have been encouraged by the NSW State Government as a method of addressing the needs of Sydney’s rapidly growing urban population (SYD-G-03). Local governments and DBSS enterprises were thus encouraged to maintain a healthy partnership that sought to “truly share” responsibility for delivering DBSS in Sydney (SYD-C-01). One interviewee suggested that this was possible in part because Sydney is recognised worldwide as an early adopter and leading innovator in developing public-private partnerships, and as a result there are fewer political constraints on this kind of collaboration between local government and private DBSS enterprises (SYD-G-01).

The development of the CG of Sydney’s DBSS has also aligned with the city’s planning and regulatory system. Since 2017, the NSW State Government and Sydney’s local governments have sought to promote the development of DBSS within Sydney through local development plans, such as NSW Future Transport 2056, Sustainable Sydney 2030-2050, and Planning for Sydney 2050. Several influential political leaders in Sydney, such as Clover Moore, also strongly encouraged DBSS enterprises to establish operations in Sydney (SYD-C-02), and proposed various measures to support the

establishment of DBSS, such as policy incentives to establish DBSS infrastructure (including adding bike lanes) (SYD-G-02). While DBSS were in theory supported in local government planning policy, it should be noted that some of our interviewees stated that the NSW State Government had provided limited regulatory frameworks for the management of DBSS. This, in turn, limited the extent to which local governments, as a third-tier authority, could govern DBSS through policy and law-making (SYD-G-01; SYD-C-01; SYD-C-04).

A final system context factor influencing how CG evolved in Sydney relates to the public policy focus on developing Sydney as a global centre for innovation. Both government authorities and DBSS enterprise representatives noted that the city's local governments and private organisations are strongly encouraged to innovate, to be open-minded about the positive role DBSS could play in the city, and to be receptive to progressive governance approaches to DBSS in Sydney (SYD-G-01; SYD-C-04).

#### **5.4.2 Dynamic interaction between local governments and private DBSS enterprises to address DBSS governance issues in Sydney (collaborative dynamics)**

This section addresses RQ2 by highlighting the interactions between local governments and private enterprises in resolving DBSS-related issues in Sydney.

#### **5.4.2.1 Principled engagement**

In Sydney, local governments began communicating with DBSS enterprises in June 2017, one month before the first DBSS fleet launched on Sydney's streets (SYD-G-01). This early dialogue explored their shared interests. While local governments were focused on supporting public amenities for their communities, and DBSS enterprises were focused on business profits, over time they recognised their interests were interdependent (SYD-G-01; SYD-C-01). As one government official remarked, "If we [local governments] get more people using bikes, we get safer streets, less traffic and a healthier urban environment; if they [DBSS enterprises] get more people using their bikes, it means they get more users and more profits" (SYD-G-04). Local government authorities and DBSS enterprise representatives noted in interviews we conducted that, during these early months, they successfully identified a mutual interest in delivering better, safer and more numerous cycling options to local communities (SYD-G-02; SYD-C-01).

Stakeholders from government and industry were also able to define and articulate a shared vision for CG of DBSS, mainly through establishing collaborative partnerships, alliances and governing mechanisms (SYD-G-01; SYD-G-03; SYD-C-01; SYD-C-02). In December 2017, local governments and DBSS enterprises clarified their respective responsibilities for Sydney's DBSS through in-depth dialogue and negotiations, which resulted in the development of the Guide for DBSS (SYD-G-01; SYD-C-01). In this Guide, DBSS enterprises (such as Reddy Go) were tasked with responsible operation

and following key established rules (SYD-C-01). Local governments were tasked with monitoring the impacts of DBSS operations on public amenities and maintaining effective communication with DBSS enterprises about these impacts.

Central to the implementation of the Guide was communication through face-to-face meetings and workshops, as well as electronic approaches to sharing and gathering feedback (via telephone, ZOOM meetings and email), which created a communication platform for CG between local governments and DBSS enterprises (SYD-G-03; SYD-C-01). A key element of this successful communication process was a sense of fairness and inclusivity. A government official noted, “We [local governments]...discuss everything with DBSS enterprises, rather than just coming up with arbitrary decisions that then others would say – it’s not reasonable” (SYD-G-02). A wide array of issues was discussed through these various communication mechanisms, including how many bikes would be operational; how the impact of these bikes on the city’s streets might be managed; how users could be motivated to wear helmets for their safety; and whether DBSS enterprises should be responsible for providing insurance to users.

However, these communication processes did not always result in agreement. A key reason given for this by both local government and DBSS enterprise interviewees was that there were a large number of local governments (and their subordinate departments, such as transport, parking ranger teams, and legal divisions) and private DBSS

enterprises involved in every decision, which made it difficult to reach consensus. With so many stakeholders, one representative would always say, “We don’t want to do that” (SYD-C-02), forcing everyone back to the drawing board.

This situation was further complicated by the limited regulatory framework developed for DBSS in Sydney by the NSW State Government (SYD-G-01; SYD-C-01). When there were differences of opinion between local governments and DBSS enterprises, or within different government departments, no one was given regulatory power by the NSW State Government to mediate or determine a clear pathway to resolve disputes or disagreements. As a result, the CG alliances developed between local governments and DBSS enterprises in Sydney were sometimes unable to come to a joint determination that could satisfy all parties.

In 2017, for instance, the Transport Department of the City of Sydney asked DBSS enterprises to deploy more maintenance staff so that illegally parked bikes could be removed more efficiently from the city’s streets. DBSS enterprises complained that it would be difficult to enact this proposal because of the high labour costs of employing the required number of maintenance staff to address this requirement. Instead, they suggested collaborating with the city’s parking rangers, but this proposal was initially rejected because the parking rangers (within those local governments) felt it would unfairly increase their workload.

#### **5.4.2.2 Shared motivations**

Our case study has revealed that the shared motivation for local governments and DBSS enterprises to engage in the CG of Sydney's DBSS was driven mainly by trust and mutual understanding and less by internal legitimacy and commitment. A key reason for this was the absence of a regulatory framework for DBSS created by the NSW State Government to legitimise CG negotiations and agreements between local governments and DBSS enterprises (SYD-G-01). This led to a greater dependence on forming a set of "gentlemen's promises" (SYD-G-02) based on trust between local governments and DBSS enterprises to support the efficient operation of DBSS in the city.

While trust-building was a slow process, the level of trust between local governments and DBSS enterprises gradually increased over the course of their collaboration between 2017 and 2020, mainly due to the previously mentioned commitment to fair and inclusive engagement. This enabled clear communication and information-sharing between local governments and DBSS enterprises, improving inter-organisational responses to DBSS management in Sydney (SYD-G-01; SYD-C-01; SYD-C-03). One enterprise manager explained, "We always have over-communicated with each other to share interests, strategies, plans, and everything that we think the other may be even remotely interested in" (SYD-C-04).

DBSS enterprises also made positive contributions to promoting mutual trust with local governments by recruiting local people as members of their business and operation teams. These staff were already familiar with the local culture, norms and policies and knew how to communicate well with the local government. One enterprise manager noted that “to build trust, we employed local people in our team from the start. We let the local people guide us in terms of how to manage the business locally with government. This enabled us to adjust to the local culture and work within the local system” (SYD-C-02).

As they built mutual trust, local governments and DBSS enterprises also developed more respect for one another. As a local government official pointed out, “[We became] very open and respectful of DBSS enterprises’ advice on what they see as some of those key principles to operate, because we recognised their expertise in DBSS operation” (SYD-G-04). An enterprise manager responded, “When we operate in Sydney, we respect and understand the transport strategy and management requirements of governments and how to better serve communities” (SYD-C-04).

While DBSS enterprises occasionally complained that local governments floated “crazy requirements” (SYD-C-04) which they considered unreasonable, for the most part these enterprises felt that they could usually find an alternative way to address any issues through open negotiation (SYD-C-01). In late 2017, for instance, the City of

Sydney introduced requirements for DBSS enterprises to maintain a 24/7 hotline to remove bikes from public areas within 20 minutes of receiving a report from a member of the public of damaged, faulty, abandoned or inappropriately parked bikes. This short time frame for removing bikes was seen as unreasonable by DBSS enterprises due to their limited maintenance capacity to address this requirement (SYD-C-01). The issue was finally resolved through a series of respectful negotiations, and the City of Sydney Council agreed to extend this time frame to seven days.

#### **5.4.2.3 Capacity for joint actions**

At the end of 2017, as previously noted, a city-level regulatory document (the Guide) was jointly created by public and private stakeholders to set out minimum standards and expectations for DBSS operations, including safety, bike redistribution and footpath accessibility. The Guide required DBSS enterprises to monitor the location of bikes at least daily, and to collaborate with local governments and public landholders to share relevant data for transport and urban planning purposes.

Other knowledge-building activities involving both local governments and DBSS enterprises developed capacity for further joint actions. For example, local governments worked with professional researchers to investigate a range of governance approaches to DBSS in other cities around the world (SYD-G-01). Dr Elliot Fishman, an experienced researcher in the bike-sharing field and team leader at the Institute of



Sensible Transport, was engaged to give advice to local governments and DBSS enterprises. In 2017, he ran a three-hour workshop in Sydney for managers from government organisations and DBSS enterprises, sharing his knowledge of successful management of other DBSS worldwide and presenting ideas that were adopted by participants (SYD-A-01).

Both local governments and enterprises took seriously their responsibility to provide leadership in the CG of DBSS, and demonstrated positive attitudes toward establishing co-leadership structures. Representatives from public and private organisations played a role in guiding the process, facilitating collaboration, bringing people together, taking the lead on different decisions, keeping participants informed, organising meetings, and inspiring others to take relevant steps. One government official said that “we are all the leaders for the CG, all of us keep track” (SYD-G-01), and another made the point that “both of us [local governments and private DBSS enterprises] were very active leaders regarding this collaboration” (SYD-G-02).

However, stakeholders from local government and industry noted that the NSW State Government did not at first play a role in supporting this leadership structure. As an enterprise manager stated, “I think that there needs to be a bold leader who can help us to promote the evolution of DBSS CG, and I think we have seen it at city level, but I don’t think we’ve seen that bold leadership yet at the state level” (SYD-C-02). Another

manager suggested that the reason for this lack of leadership from the NSW State Government might be political, given that the widespread operation of various DBSS in Sydney is still somewhat controversial. A significant portion of the public remains opposed to DBSS because of safety issues for pedestrians and disruption to urban amenities caused by the disorderly parking of bikes (SYD-C-01).

While there was political will among local governments and DBSS enterprises to support the CG of Sydney's DBSS, it was widely acknowledged by both public and private actors that the capacity to mobilise resources (particularly financial resources) remained limited (SYD-G-01, SYD-C-01). Interviewees highlighted the fact that little political or financial support was provided by the NSW State Government (SYD-G-02, SYD-C-01). They also noted that local governments, due to competing demands on their funding, had limited capacity to fund DBSS operations, and, as such, the private DBSS enterprises were the primary funding source for any initiatives (SYD-G-02, SYD-C-03). These constraints somewhat curbed the capacity of local governments to facilitate collaboration and joint actions (SYD-G-01).

### **5.4.3 The degree of improvements to DBSS in Sydney under public-private sector collaboration (collaborative actions, outcomes and adaptations)**

This section, which addresses RQ3, explains how the collaborative dynamics previously delineated helped to propel collaborative actions and outcomes within the CG of Sydney's DBSS between 2017 and 2020.

#### **5.4.3.1 Collaborative actions and outcomes**

The ability of local governments and DBSS enterprises to realise their common goal of ensuring better, safer and more numerous cycling options across Sydney was enabled by their collaborative actions, which were aimed at fostering dialogue and effective joint management mechanisms.

A key example of this was the establishment of regular communication channels between local governments and DBSS enterprises. Since mid-2017, local governments and DBSS enterprises have institutionalised their communication methods by committing to scheduled regular meetings (SYD-G-1; SYD-C-2). According to notes from the symposium organised by Meituan Bike, meetings were held weekly and monthly. In the early stage of the collaboration, meetings were more frequent, and sometimes government officials met general managers of DBSS enterprises every day. This frequent contact allowed collaborators to develop familiarity with each other and revealed "pain points" and shared areas in which to collaborate (SYD-C-03). One enterprise manager described the positive impact of this continuing dialogue as follows:

“Partnership has become better than it was in 2017: we have regular dialogue, sharing [of] ideas, working together on problems, and are operating in a mutually supportive and constructive relationship” (SYD-C-01).

Another example of a successful collaborative action was the development of joint management policies. During the second half of 2017, local governments – in collaboration with DBSS enterprises – developed a series of management policies through four important round-table meetings. Each of the proposed rules was repeatedly confirmed through emails between local governments and DBSS enterprises, with consensus-based management norms formally established in the Guide (SYD-G-01; SYD-C-01). Interviewees highlighted how the Guide provided an essential resource in making important improvements to DBSS operations in different local government areas. One scholar from Sydney indicated that the Guide established formal rules for DBSS management in Sydney, which helps enterprises better regulate and punish users’ illegal behaviours (according to a note from the symposium organised by Southeast University). An enterprise manager also commented, “Currently, issues of bike congestion and disorderly parking...rarely happen, which is the most direct manifestation of the success of [the collaboration]” (SYD-C-04).

The benefits of the CG to the governance of Sydney’s DBSS can be summarised as follows:

1. Sydney's local governments and DBSS enterprises established a stable communication mechanism through collaboration, which provided a fair and open platform for them to negotiate and solve problems. Based on this platform, they improved partnerships, exchanged information, shared resources and planned joint actions;
2. Through collaboration, Sydney's local governments and DBSS enterprises have made many innovations in institutional arrangements and management policies, which have become fundamental rules for the management of DBSS in Sydney. These newly established rules have effectively improved the governance level of DBSS in Sydney.

While most local governments and DBSS enterprises engaged over time in these collaborative actions, not all DBSS enterprises regularly participated in communication or maintained an active level of engagement with local governments (SYD-C-01). For example, some DBSS enterprises were only prepared to communicate with local governments through informal channels, such as email or phone, and avoided the round-table meetings (SYD-G-03; SYD-C-01; SYD-C-02).

Local governments, for their part, did not always have the budget to recruit enough staff to participate directly in frontline management actions, and instead had to play the role of messenger in the daily management of DBSS. When government officials received

reports about illegal bike-dumping from citizens or rangers, for instance, they would, by necessity, delegate the clean-up to the relevant DBSS enterprise. This could take a fairly long time, making it difficult for the local government to fulfil its duties to the community. Without the ability to detect these kinds of problems in real time, DBSS enterprises had a lot of “wobble room” to evade their management responsibilities and duties. While these problems of bike congestion and disorderly bike parking in Sydney have gradually been reduced, the situation is still far from the ideal expectations laid out in the Guide (SYD-G-02).

#### **5.4.3.2 Adaptations**

Interviewees from Sydney’s local governments, private DBSS enterprises and academia described the participatory process of collaborative actions as “governance innovation” (SYD-G-03). It was an adaptive process that resulted in shared learning and trust among participants. An example of the potential to adapt is the recent attempt by the NSW State Government to begin to engage in the CG frameworks that had already been established by local governments and DBSS enterprises between 2017 and 2020. From the end of 2018, when the NSW State Government realised there were benefits to the CG of DBSS, they began to provide more political and technical support to these established collaborations. For example, the NSW State Government has started collaborating with technical experts to develop a management app that integrates the operational information of all DBSS enterprises to enable convenient monitoring by local governments and enterprises (SYD-G-03).

## 5.5 Discussion and Conclusion

This case study identifies a range of social, cultural and political contextual factors that determined the particular evolution of the CG of DBSS in Sydney, Australia. Despite limited support from the NSW State Government, there was significant collaboration, power-sharing and joint decision-making between local governments and DBSS enterprises from early in the establishment of these dockless bike-sharing schemes.

Our findings confirm the argument of Berends et al. (2016), who state that contemporary Australian governance structures provide a favourable environment for developing CG, as well as research by O'Flynn and Wanna (2008), who argue that Australia's democratic culture and political traditions allow government and industry to collaborate on an equal footing. Yet it is also important to note that the mostly successful CG of Sydney's DBSS only came about in the wake of crisis and discord, as local governments and DBSS enterprises responded to negative impacts on the city's amenities and public order posed by the newly established DBSS before proper oversight was established. This finding corresponds with some earlier research on Sydney's DBSS (Ma et al., 2018; Chen, 2019; Fishman, 2019).

Our case study of CG of DBSS in Sydney reveals the significance of cultural and political context in any understanding of collaborative governance. Our findings in this

paper show that Sydney's context stands in stark contrast to Nanjing's context, as explored by Cao et al. (2022). That companion case study, on the CG of DBSS in Nanjing, China, showed that the government-led CG model for DBSS was shaped by a hierarchical culture and political tradition, with significant power imbalances between government authorities and private DBSS enterprises.

This paper is the first to recognise that the principles of fairness and inclusivity in negotiating and decision-making are crucial to successful CG between local governments and private enterprises. This finding is quite different to some prior studies (Huanming Wang et al., 2019; Wang et al., 2020; Cao et al., 2022) that have focused on the CG of DBSS in China. Those researchers argued that CG is predominantly politically motivated, and that a free and fair public-private engagement is only possible when the overall goals align with government ideology.

Our findings in this case study support those of Holbrook (2020), who has shown that an open and democratic CG process allows participants to overcome any rivalries or suspicions that might impede genuine collaboration, and encourages trust-building. The alliance of local governments and DBSS enterprises in Sydney led to regular and clear communication, institutional innovation, knowledge-building, higher levels of trust and mutual respect. This supports Janine (2008)'s insight that trust can help to "unlock" the distinctive capacities of actors in any collaboration.



We have shown that opportunities for equal engagement and building high levels of trust between local governments and DBSS enterprises can lead to positive collaborative actions, outcomes and adaptations in the short and long term, including healthy communication mechanisms and sustainable management policies. These findings support the argument of Schlæger (2015), who highlights the way in which mutual trust and constructive relationships are effective instruments to drive any collaborative governance process.

Overall, our case study shows that, compared to the early stage of DBSS in 2017 (when CG was not implemented), the public-private partnership between local governments and DBSS enterprises has produced significant positive effects on Sydney's DBSS governance over the last three years, and led to the widespread implementation of CG.

These positive effects are mainly reflected in the refinement and sophistication of the collaboration mechanism, communication mechanism, and management mechanism. As a result of these mechanisms, the network between local governments and DBSS enterprises has become closer and denser, the level of trust between them has been improved, and conflicts have gradually been resolved. This finding confirms the arguments of some scholars (Huxham and Vangen, 2004; O'Flynn and Wanna, 2008), who note that cross-sector collaboration allows actors to negotiate and make decisions

like friends, rather than as enemies. In addition, Sydney's local governments and DBSS enterprises can now use consensus-based rules (the Guide) to manage DBSS. Since the collaboration began, no actor has carried out unilateral actions as they did in the early stage of DBSS in 2017 (such as local governments impounding bikes without notifying DBSS enterprises). This finding supports that of O'Flynn and Wanna (2008), who point out that cross-sector collaboration can help actors establish rules and find a transformational way to address dilemmas.

This case study also shows that a lack of active engagement and leadership by the NSW State Government within the CG of Sydney's DBSS had a somewhat negative impact. This left an identified gap in terms of a strong external initiator, arbitrator and decision-maker – a gap that hindered local governments and DBSS enterprises in establishing stable collaborative leadership mechanisms. This confirms the findings of Wang et al. (2020), who highlight how essential and irreplaceable a strong and highly capable public sector is in terms of mobilising key resources to support collaborative governance processes.

We have noted in more detail some of the negative impacts of this initial inaction by the NSW State Government in terms of supporting the CG of Sydney's DBSS. This sent the wrong message to DBSS enterprises that they could selectively participate in the CG, which meant that some enterprises only half-heartedly implemented and

enacted newly established collaborative rules. Our findings in this regard are consistent with those of Liu et al. (2016), who note that a lack of strong leadership in a public-private collaboration means that accountability cannot be ensured. Similarly, O'Flynn and Wanna (2008) highlight the fact that private actors will not make a concerted effort to pursue mutually beneficial outcomes without a binding force from higher authorities. Wang et al. (2020) also argue that if a CG scheme has no strong or authoritative leader, more effort will be required from all parties to achieve successful outcomes.

Finally, this paper tracks significant adaptations in the CG of Sydney's DBSS. The NSW State Government, as noted, has already made a series of gradual changes to demonstrate their commitment to CG. Once they had recognised the benefits of the CG of DBSS, they began to provide much-needed legislative and technical support. This finding corresponds with the argument of Ansell and Gash (2008), who indicate that the "small wins" from collaborative actions are achieved in an iterative cycle, propelling the participants forward, and encouraging a virtuous cycle of collaboration.

Beyond these practical insights, our case study also has theoretical implications for the conceptualisation of CG in the growing sharing economy, thanks to our application of the Integrative Framework for Collaborative Governance as defined by Emerson and Nabatchi (2015). We used this Integrative Framework to guide our focus on the contextual aspects that promoted or hindered the establishment and forward momentum

of the CG of Sydney's DBSS. Our findings highlight the advantages of Australia's democratic culture and political traditions, and the key role this political context plays in supporting collaborative processes of urban governance. These favourable conditions encourage equal public-private engagement, establish trust in partnerships, and support the sustainability of any CG framework.

This further supports the findings of Emerson et al. (2012), who suggest that any Collaborative Governance Regime (CGR) depends on principled engagement because it fosters the development of shared motivation and, in turn, the capacity for joint actions. We have also documented the observed negative impacts of the absence of stable and strong leadership on CG actors' capacity to build and sustain governance structures, mobilise resources and motivate long-lasting joint actions.

Our research findings have clear implications for urban governance policy and practice in the growing sharing economy. Sydney's DBSS provides a unique opportunity to track both public and private interests as they have played out in urban governance over time. This is important because it has been suggested that the success of DBSS and other transport-sharing ecosystems (such as car-sharing) not only increases profits for businesses, but also benefits entire local communities (Dowling and Kent, 2015; Wang et al., 2019). We have shown that any successful CG collaboration depends in part on establishing regular communication channels, knowledge-sharing and trust-building

between participants. However, as our study highlights, this bottom-up approach to CG governance does not always lead to agreement, and higher-level government authorities need to play an active leadership role in any CG framework. In Sydney, as we have discussed, local governments and DBSS enterprises would have benefited from NSW State Government-led policy, legislation, financial and technical resources, and clear mediation and conflict resolution pathways.

While we provide insights into the specific context that has shaped the CG of DBSS in Sydney, there are some limitations to our study that suggest avenues for future research. We have adopted only qualitative methods to explore the CG framework of Sydney's DBSS. Future research could explore the complex causal factors behind the interactive process and outcomes by using a mixed or triangular method. We also note that we had limited access to internal or classified documents from local governments or DBSS enterprises in Sydney; future researchers could negotiate gaining access to this kind of material.

In our case study of the CG of the DBSS in Nanjing, China (Cao et al., 2022), we explore a more authoritarian, top-down CG model for DBSS within a Chinese political and cultural context. Our research outcomes in that case study highlight the advantages of Nanjing's local governments in being able to direct the CG processes of DBSS, due to their capacity to rapidly mobilise a series of key political and fiscal resources (Cao

et al., 2022). The CG of Nanjing's DBSS is driven by cultural and political factors that have obvious differences from Sydney's bottom-up, consensus-based CG model. To be more specific, Sydney's culture emphasises liberalism and democracy, while Nanjing's culture emphasises centralism and government authoritarianism. The power relations between local governments and DBSS enterprises in Sydney are more equal, while in Nanjing, DBSS enterprises are in a weaker power position relative to local governments.

The two CG models have also generated different outcomes for DBSS governance. For example, Nanjing's CG model can improve the governance of DBSS in a shorter time frame, thanks to the strong administrative power of local government. Yet if such collaboration continues to develop over time in an unequal partnership, the CG model is harder to maintain, and the effectiveness of the CG is diminished.

By contrast, the bottom-up CG of Sydney's DBSS is more likely to be sustainable in the long term, though it requires ongoing time and effort by all actors. This is evident in the increasingly active involvement of the NSW State Government, Sydney's local governments, and DBSS enterprises in maintaining the partnership. Future research could focus on synthesising insights from both top-down and bottom-up case studies of CG, comparing the contextual factors and dynamic interactions of stakeholders in these two models, and weighing up the advantages and drawbacks to both approaches.

### **Author Contributions**

All of the authors have contributed to the ideas contained in this paper. Jun Cao collected the data and wrote the manuscript. Jason Prior supervised the overall work and polished the wording of this paper. Damien Giurco provided constructive advice to improve the manuscript. All authors have read and agreed to the published version of the manuscript.

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### **Institutional Review Board Statement**

The study was conducted in accordance with the National Statement on Ethical Conduct in Human Research (2007), and approved by the UTS Human Research Ethics Committee of University of Technology Sydney (Protocol code: ETH20-5008, Date of approval: 29 June 2020).

### **Informed Consent Statement**

Informed consent was obtained from all subjects involved in the study.

### **Data Availability Statement**

Not applicable.

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### **Conflicts of Interest**

The authors declare no conflicts of interest.



## References

- Agyeman, J. & McLaren, D. (2017). *Sharing Cities: A Case for Truly Smart and Sustainable Cities*. Cambridge, Massachusetts: MIT Press.
- Ansell, C. & Gash, A., (2008). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research & Theory*, 18 (4), 543-571.
- Berends, L., Ritter, A. & Chalmers, J. (2016). Collaborative Governance in the Reform of Western Australia's Alcohol and Other Drug Sector: Reform of WA Alcohol and Other Drug Sector. *Australian journal of public administration*, 75 (2), 137-148.
- Bryson, J.M., Crosby, B.C. & Stone, M.M. (2006). The Design and Implementation of Cross-Sector Collaborations: Propositions from the Literature. *Public Administration Review*, 66 (s1), 44-55.
- Cao, J., Prior, J., Gu, D. & Giurco, D. (2022). How do government and industry engage in the collaborative governance of dockless bike-sharing schemes in Nanjing, China? *Urban Policy and Research*, 40 (3), 1-15.
- Cao, J., Prior, J. & Moutou, C. (2021). The governance of dockless bike-sharing schemes: A systemic review of peer-reviewed academic journal papers between 2016 and 2019. *Cleaner Engineering and Technology*, 4, 100140.
- Chen, R. (2019). “Bike litter” and obligations of the platform operators: Lessons from China's dockless sharing bikes. *The computer law and security report*, 35 (5), 105317.
- Creswell, J.W. (2014). *Research design : qualitative, quantitative, and mixed methods approaches* (4th ed.). Thousand Oaks, California: Sage Publications.
- Demaio, P. (2009). Bike-sharing: History, Impacts, Models of Provision, and Future. *Journal of Public Transportation*, 12 (4), 41-56.
- Dowling, R. & Kent, J. (2015). Practice and public–private partnerships in sustainable transport governance: The case of car sharing in Sydney, Australia. *Transport policy*, 40, 58-64.
- Emerson, K. & Nabatchi, T. (2015). *Collaborative Governance Regimes*. Washington, DC: Georgetown University Press.

- Emerson, K., Nabatchi, T. & Balogh, S. (2012). An Integrative Framework for Collaborative Governance. *Journal of Public Administration Research & Theory*, 22 (1), 1-29.
- Faghih-Imani, A. & Eluru, N. (2015). Analysing bicycle-sharing system user destination choice preferences: Chicago's Divvy system. *Journal of Transport Geography*, 44, 53-64.
- Fishman, E. (2019). *Bike Share (1st ed.)*. Oxfordshire, England: Routledge.
- Gao, Q. & Li, Z.H. (2018). Analysis of the collaborative governance of bike sharing based on SFIC model. *Science & Technology for Development*, 14, 39-43. [In Chinese]
- Guo, P., Lin, X.Z., Huang, Y., Tu, S.M., Bai, X.M., Yang, Y.W. & Ye, L. (2017). Sharing bike: collaborative governance in Internet technology and public services. *Journal of Public Management*, 14, 1-10. [In Chinese]
- Hamari, J., Sjöklint, M. & Ukkonen, A. (2016). The sharing economy: Why people participate in collaborative consumption. *Journal of the Association for Information Science & Technology*, 67 (9), 2047-2059.
- Heymes, C. & Levinson, D. (2019). Stationless in Sydney: The Rise and Decline of Bikesharing in Australia. *Transport Findings*.
- Holbrook, C. (2020). Redesigning collaborative governance for refugee settlement services. *Australian journal of political science*, 55 (1), 86-97.
- Huxham, C. & Vangen, S. (2000). Leadership in the Shaping and Implementation of Collaboration Agendas: How Things Happen in a (Not Quite) Joined-up World. *Academy of Management journal*, 43 (6), 1159-1175.
- Huxham, C. & Vangen, S. (2004). Doing things collaboratively: realizing the advantage or succumbing to inertia? *Organizational dynamics*, 33 (2), 190.
- Janine, O.F. (2008). *Elusive appeal or aspirational ideal?: The rhetoric and reality of the 'collaborative turn' in public polic*. Canberra, Australian Capital Territory: ANU Press.

- Jia, L., Liu, X. & Liu, Y. (2018). Impact of Different Stakeholders of Bike-Sharing Industry on Users' Intention of Civilized Use of Bike-Sharing. *Sustainability*, 10 (5), 1437.
- Jin, J. & Bian, S.J. (2018). The cooperative governance route of urban shared bicycle based on stakeholder perspective: a case study of Nanjing, Jiangsu province. *Urban Development Studies*, 25, 92-99. [In Chinese]
- Jing, Y. & Li, D. (2019). Private roles in enhancing Multi-Level Governance: China's "Internet + " national strategy. *Public policy and administration*, 34 (2), 144-164.
- Klijn, E.-H. (2012). Governance network theory: past, present and future. *Policy & Politics*, 40 (4), 587-606.
- Koschmann, M.A., Kuhn, T.R. & Pfarrer, M.D. (2012). A Communicative Framework of Value in Cross-Sector Partnerships. *Academy of Management Review*, 37 (3), 332-354.
- Liu, T., Wang, Y. & Wilkinson, S. (2016). Identifying critical factors affecting the effectiveness and efficiency of tendering processes in Public–Private Partnerships (PPPs): A comparative analysis of Australia and China. *International journal of project management*, 34 (4), 701-716.
- Ma, Y., Lan, J., Thornton, T., Mangalagu, D. & Zhu, D.J. (2018). Challenges of collaborative governance in the sharing economy: The case of free-floating bike sharing in Shanghai. *Journal of Cleaner Production*, 197, 356-365.
- O'flynn, J. & Wanna, J. (2008). *Collaborative governance : a new era of public policy in Australia?* Canberra, Australian Capital Territory: ANU Press.
- Qiao, M. (2016). Economic Linkages of China's Small Towns: Urban-Rural Integration in a Learning Economy. Dissertation, The University of Manchester.
- Qin, Z. & Wang, Q. (2017). Synergy mechanism in the vision of sharing economy: taking shared bikes for example. *Reform*, 30, 124-134. [In Chinese]

- Ring, P.S. & Van De Ven, A.H. (1994). Developmental processes of cooperative interorganizational relationships. *The Academy of Management Review*, 19 (1), 90-118.
- Schlæger, J. (2015). Collaboration in China's E-Government: A Cultural-Theory Analysis. In: Y. Jing (ed.). *The Road to Collaborative Governance in China*. New York City: Palgrave Macmillan.
- Selin, S. & Chevez, D. (1995). Developing a collaborative model for environmental planning and management. *Environmental management (New York)*, 19, 189-195.
- Shaheen, S.A., Guzman, S. & Zhang, H. (2010). Bikesharing in Europe, the Americas, and Asia: Past, Present, and Future. *Transportation Research Record*. SAGE Publications Inc, 159-167.
- Shi, J.-G., Si, H., Wu, G., Su, Y. & Lan, J. (2018). Critical Factors to Achieve Dockless Bike-Sharing Sustainability in China: A Stakeholder-Oriented Network Perspective. *Sustainability*, 10 (6), 2090.
- Sun, Y.Y. (2018). Sharing and Riding: How the Dockless Bike Sharing Scheme in China Shapes the City. *Urban Science*, 2 (3), 68-68.
- Wang, H., Chen, B., Xiong, W., Yang, L. & Zhu, D. (2019). Multiple Pathways to Public-Private Partnerships for Urban Public Service Delivery: A Cross-City Comparison of Bicycle-Sharing Service in China. *Urban Policy and Research*, 37 (4), 1-15.
- Wang, H., Xiong, W., Yang, L., Zhu, D. & Cheng, Z. (2020). How does public-private collaboration reinvent? A comparative analysis of urban bicycle-sharing policy diffusion in China. *Cities*, 96 (4), 102429.
- Yin, J., Qian, L. & Shen, J. (2019). From value co-creation to value co-destruction? The case of dockless bike sharing in China. *Transportation Research Part D Transport and Environment*, 71, 169-185.
- Yin, R.K., 1994. *Case study research : design and methods* (2nd ed.). Thousand Oaks, California: Sage Publications.

Zhao, D. & Wang, D. (2019). The Research of Tripartite Collaborative Governance on Disorderly Parking of Shared Bicycles Based on the Theory of Planned Behavior and Motivation Theories—A Case of Beijing, China. *Sustainability*, 11 (19), 5431.

# **Chapter 6: A discussion of research findings and broader implications from comparative case studies in Nanjing and Sydney**

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## **Chapter preface**

The goal of my thesis research project has been to compare and contrast the government-enterprise collaborations in the respective governance of Nanjing and Sydney's DBSS, and to consider these practical findings through the theoretical lens of Emerson et al. (2012)'s Integrative Framework for Collaborative Governance. I focused in particular on the system context, collaborative dynamics, and outcomes and adaptations of CG in each of these two cities.

This discussion chapter is divided into three parts. The first part contains a re-formatted version of a co-authored paper (with me as lead author) published in the peer-reviewed journal *Humanities and Social Sciences Communications*, entitled "Power relations are central to shaping collaborative governance of the urban sharing economy." This paper closely examines the influence of system context on the different forms that CG can take, focusing especially on how power relations between actors shape the CG of DBSS in global cities.

The second part of this chapter presents a comparison of my research findings from the two case studies (of Nanjing and Sydney's DBSS), examining the different or similar system contexts, collaborative dynamics, and outcomes and adaptations of CG

in each city. The third part is a discussion of lessons learned and the broader practical and theoretical implications of this research, particularly in terms of improving future governance of DBSS services in Nanjing and Sydney, as well as in other global cities.

### **Paper preface**

As noted above, Section 6.1 comprises a re-formatted version of a research paper published in a peer-reviewed *Nature Research Journal (Humanities and Social Sciences Communications)*. The full citation for this paper (including all authors) is:

**Cao, J.**, Prior, J., Giurco, D., Gu, D. (2023). Power relations are central to shaping collaborative governance of the urban sharing economy. *Humanities and Social Sciences Communications* 10 (1), 85.

### **Statement of contribution**

Jun Cao contributed the core ideas presented in this paper. Jun Cao collected the data and wrote the manuscript. Jason Prior and Damien Giurco supervised the overall research, and made editorial improvements to this paper. Dasong Gu provided constructive advice to improve the manuscript.

### **Research highlights**

1. This paper discusses how power relations between local governments and private companies affect the CG of urban DBSS programs in global cities.

2. It applies certain theoretical elements from Emerson et al. (2012)'s Integrative Framework for Collaborative Governance to the practical findings from two case studies (Sydney and Nanjing).
3. It highlights both the potential advantages and negative impacts of centralised and decentralised power distribution modes of CG.
4. It discusses the wider practical and theoretical implications of the research findings, and provides recommendations to improve both centralised and decentralised models of CG of DBSS.





ARTICLE



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OPEN

## Power relations are central to shaping collaborative governance of the urban sharing economy

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### Abstract

Since its rise in the early 2000s, the sharing economy has expanded and developed rapidly worldwide. While the sharing economy can boost resource use efficiency and encourage sustainable urban living, it also challenges urban governance. Recently, a collaborative governance (CG) approach involving public and private partnerships has been adopted in various global cities to address these governance dilemmas. However, the influence of stakeholder power relations on the CG of the sharing economy remains inadequately explored in the literature. This article argues that multi-actor collaboration can be enhanced by clarifying how power relations shape effective governance, actor engagement, shared motivation, and capacity for joint actions. This article draws on practical insights by discussing examples of the governance practices of urban bike-sharing programs to demonstrate how the nature of public-private power relations can result in specific (and quite different) forms of CG. This article will help CG researchers, policymakers, urban planners, and communities to understand CG practices in the new era of shared cities and global cities.

## 6.1 Introduction

The concept of sharing is foundational to all human societies (Agyeman and McLaren, 2017). In recent years, driven by information and communications technologies (ICT) and commercial capital, modes of sharing have evolved into a new economic form, that of the urban sharing economy (Ryu et al., 2019). With a broad range of urban services increasingly shareable (Hamari et al., 2016), many global cities are embracing the idea of a ‘sharing city,’ and encouraging sharing economy entrepreneurship to open up new possibilities and pathways towards sustainable urban living (Agyeman and McLaren, 2017). However, these same innovations can sometimes pose unexpected challenges to urban governance: bike-sharing users, for instance, often park shared bikes disorderly on pedestrian paths and in public squares, disrupting public urban spaces (Zhao and Wang, 2019). One of the most innovative solutions to this problem has been a collaborative governance (CG) approach, where actors from government and privately owned sharing platforms work together (Cao et al., 2022). CG is well-suited to resolving urban sharing economy governance issues that are too complex to be adequately handled by any single organisation (Ma et al., 2018).

All CG, at some level, is shaped by power relations (Jill, 2016), and the CG of the urban sharing economy is no different. As innovative forms of CG between public and private actors have emerged in recent years in global cities to govern the sharing economy, we need to be closely attuned to the power relations that undergird them. Many factors influence CG’s effectiveness, but the power relations between private and public stakeholders are foundational because they define how actors engage with one another in practice.

Power relations directly affect the CG of any sharing economy because they are key to every practical process, including convening actors, framing problems, negotiating meaning, and making decisions (Jill, 2016). Power relations shape actors' participatory motivations and perceptions, as well as fostering (or eroding) trust and mutual understanding. This, in turn, affects actors' commitment to CG as a concept or principle, and encourages or constrains actors' capacity to leverage key resources and build institutional arrangements and leadership to implement joint actions (Emerson and Nabatchi, 2015).

A growing body of sharing economy literature has begun to recognise the importance of urban contextual factors to the evolution of CG in any sharing economy (Davidson and Infranca, 2016; Barile et al., 2021). These factors can be socio-economic (Vith et al., 2019), cultural (Barile et al., 2021; Cao et al., 2022), political (Wang et al., 2020b; Cao et al., 2022), institutional (Wang et al., 2019; Van Waes et al., 2020), policy-related (Chen, 2019; Han, 2020; Aguilera et al., 2021) and legal (Tremblay-Huet et al., 2018). However, only limited research (Wang et al., 2020b; Cao et al., 2022) has thus far investigated the impact of power relations on determining the specific collaborative processes that emerge in these urban governance regimes.

The existing sharing economy literature (Wang et al., 2020) mainly delineates two types of CG: authoritarian CG, and self-organised CG. Each type clearly signifies the nature of the power relations between actors. In authoritarian CG, power relations among actors are centralised, creating a significant power imbalance. In self-organised CG, power relations are decentralised, with less power disparity between actors. The question that has not yet been sufficiently considered in existing research literature is

how these two types of power relations determine the collaborative dynamics of actors (such as engagement, motivation, and capacity for joint actions) in the governance of a sharing economy. By addressing this question, our paper makes an original contribution to the field of CG of the sharing economy.

Our insights on this topic emerge from detailed research into the CG practices of dockless bike-sharing schemes (DBSS) in different global cities. Shared mobility services like bike-sharing form an important part of the backbone of the sharing economy. In recent iterations, the collaborative governance regimes of these schemes mainly include two key groups of actors: government officials, and representatives from private DBSS enterprises.

We have observed that the power relations established within any CG regime designed to govern DBSS have a significant impact on *how* government and private DBSS enterprises engage. The type of power relations (centralised versus decentralised) sets the tone for actors' involvement and motivations, and strongly shapes how governance structures operate in everyday practice. Given the importance of the sharing economy in global cities today – and the rise of CG as an innovative public-private partnership to address policy challenges – we hope this discussion will interest CG researchers working in any field. To keep things grounded, we have included concrete examples of how power dynamics affect the CG of DBSS in global cities, based on our fieldwork.

We believe that looking at the CG of DBSS is a useful lens through which to explore the impact of power relations on the CG of any urban sharing economy. Yet we also acknowledge that – due to the necessarily limited length of a ‘Comment’ paper – we cannot cover the full range of possible power relations between actors involved in the CG of a sharing economy, and that insights from the CG of DBSS may not always apply to other sharing economy domains.

## **6.2 Power relations strongly influence the engagement of actors in CG**

In a typical example of an authoritarian CG of DBSS, the government dominates the collaborative process, while private DBSS enterprises are marginalised. In this mode of CG, the government is the stronger, more dominant actor. This puts enterprises in a weaker position of being ‘invited assistants,’ there to follow the orders of government actors who behave as ‘commanders.’

In the DBSS of Chinese cities such as Beijing (Wang et al., 2019) and Shanghai (Ma et al., 2018), for instance, the government had the power to make macro-regulations and to set management policies, while the DBSS enterprises played the role of simply complying with the government’s directives, due to their low discursive legitimacy.

Another common factor of authoritarian CG is that the collaborative process is mandated – rather than voluntary – on the part of private DBSS enterprises. Governments thus have the power to intervene in all decisions, in an all-encompassing manner. This means that the government, as the stronger actor, controls the agenda, including the process design and content of the collaboration, manoeuvring the

sequence of joint actions, and triggering policy windows (Purdy, 2012). The government also has the ability to make rapid decisions and adjust existing targets in line with their interests.

The negotiation processes in the authoritarian CG of DBSS in Chinese cities such as Nanjing (Cao et al., 2022), for instance, were not always inclusive. Indeed, inclusivity was only encouraged when government goals were not being challenged. As the final decision-maker, the strategic needs of the local government took priority, and they often unilaterally made decisions based on their administrative powers and judgement. These decisions were converted into management policies without the relevant opinions of the DBSS enterprises.

By contrast, in instances of self-organised CG of DBSS – such as in Boston’s Metropolitan Area, in the U.S. (Hauf and Douma, 2019) – the regional governance processes are led by both local governments (or their subordinate departments, who are right-of-way owners) and private DBSS enterprises. Each actor takes seriously their responsibility to provide leadership, and each plays a role in promoting the collaborative process.

In this kind of self-organised CG, government and enterprise actors more equitably share both the burdens and privileges of partnership. This mode of collaboration is usually initiated from the bottom up rather than from the top down; partnerships are formed based on voluntary and more equal participation, not hierarchical control. Decentralised power relations limit certain actors’ unilateral actions in the

collaboration process (Ran and Qi, 2018). Government and enterprise actors become co-founders and facilitators of self-organised CG, and pursue collaborative approaches instead of entrenching their own dominance. Negotiations and meetings in a self-organised CG tend to be informed by a sense of equity and inclusivity, with no one actor exerting undue power or influence.

Yet decentralised power relations can often frustrate rather than expedite decision-making, as each actor tends to defend their turf and prevent decisions from being taken contrary to their interests (O'Flynn and Wanna, 2008). In the self-organised governance of Sydney's DBSS in Australia (Cao et al., 2022), for instance, actors often struggled to consistently or reliably reach agreement, and this considerably slowed down the consensus-building and policymaking process. This was, in part, due to the large number of participating local government officials, members of subordinate departments, and representatives of DBSS enterprises who needed to agree in order to move forward. There was always one actor who had a different perspective.

### **6.3 Power relations affect actors' motivations to collaborate in CG**

An authoritarian CG is usually not conducive to fostering trust, and may even undermine the level of trust between actors. When the power relations between the government and DBSS enterprises are asymmetrical, their shared motivation to engage in CG is driven by an intrinsic awareness of necessary trade-offs or compromises, rather than by trust or mutual understanding. Enterprises in a weaker power position aim to help the government achieve its goals in exchange for support and favourable treatment (Wang and Yin, 2012). The legitimacy of authoritarian CG is derived from

the government's political authority, which actors must acknowledge in order to participate and reap any rewards of collaboration.

For instance, in the CG of DBSS in most Chinese cities, the local government was usually willing to collaborate actively with enterprises only because establishing the CG regime for DBSS was itself a 'political task' set by a higher authority (Wang et al., 2020). China's bureaucratic system puts political performance front and centre in evaluating officials' progress (Zhu, 2017). Promoting the CG of DBSS was an important ritual for officials to display respect and loyalty to higher authorities, and a chance to recommend their own established CG models as a significant indicator of their performance.

When the government approached DBSS enterprises with the invitation to collaborate, those enterprises became willing partners with the government, even though they were aware that the power relations within the CG regime would be asymmetrical. They remained willing partners because the government controlled critical political, administrative and financial resources that DBSS enterprises needed, and could unilaterally decide which enterprises would be allowed to operate (and survive or thrive in the long-term) in the city.

Within a self-organised CG, the motivation of government and private enterprises to collaborate is instead driven by high levels of trust and mutual understanding. Decentralised power relations encourage actors to cultivate reciprocal and trustful relations (Linder, 1999). This allows participants to achieve greater distributive justice



through power-sharing, and to cultivate a robust collective identity they all believe in – exactly *because* they perceive the collaboration to be based on inclusion, equal representation, shared accountability, shared goals, and collective interests.

In December 2020, Lime (an American DBSS enterprise) established self-organised CG schemes with some local governments in NSW and Victoria (in Australia). These schemes were designed as equal partnerships between local governments and DBSS enterprises, enabling them to share their respective strategies and plans as transparently as possible (Mehmet, 2020). They could thus look after each other's interests, and improve inter-organisational responses. Both government and enterprise actors were very open to collaboration, willing to listen to each other, and able to respect each actor's advice when it came time to share ideas for the successful management of urban DBSS (Cao et al., 2022). This strong collective identity strengthened the internal legitimacy of the collaboration, and allowed local governments and DBSS enterprises to make shared commitments.

#### **6.4 Power relations affect actors' capacity for joint actions**

Within an authoritarian CG, the capacity for joint action is dictated by the government, and this is the wheel that starts turning before other factors (such as engagement, or the motivation to participate) are set in motion. The government ensures their goals will be reached by firmly establishing their status as the CG partnership leader, and by making top-down, target-oriented rules so that DBSS enterprises have to act according to their requirements (Ma et al., 2018).

In the CG of DBSS in major Chinese cities such as Shenzhen, Jinan and Chengdu (Wang et al., 2020), the first step in the collaboration was the government promulgating their official guidance on DBSS operation. This articulated a government-led leadership structure and pre-established management policies that DBSS enterprises had to follow – essentially forcing (rather than coaxing) joint action. In this way, the government created very effective drivers, and mobilised significant resources to establish the collaborative scheme (Provan and Milward, 1995). They insisted on enterprise participation, using all the administrative powers and resources at their disposal.

However, this heavy-handed intervention by the government (and their investment in DBSS infrastructure) may also have predisposed DBSS enterprises to free-riding on that government investment. These enterprises only played a marginal role in investing in these kinds of large-scale governance infrastructure. They had strong incentives to let the government do as much as possible – not only to reduce their operational costs, but to avoid the risk of criticism (Wang and Yin, 2012).

Within a self-organised CG, leadership is instead equally shared by government and private enterprise representatives. Both parties tend to have a positive attitude towards guiding the process, facilitating collaboration, bringing people together, taking the lead, informing colleagues, organising meetings, formulating ground rules, and inspiring others to take action.

In the CG of Sydney's DBSS (Cao et al., 2022), local governments and DBSS enterprises jointly formulated the shared leadership ground rules by releasing the *Inner Sydney Bike Share Guidelines*. This document set out rules and expectations for DBSS management, which were not formulated in advance by any single actor, but developed based on all actors reaching a consensus.

However, when power is shared more equitably between government and enterprise actors, this can sometimes mean that the CG structure is without a dominant leader. Achieving consensus and taking concrete steps toward real outcomes can, as a result, require more time and effort from everybody involved (Wang et al., 2020). Self-organised CG can be a time-consuming and slow-moving process. The resulting capacity of local governments and DBSS enterprises to mobilise resources to fund essential governance infrastructure is, as a result, more limited.

As a concrete example, in the early stages of the self-organised CG of DBSS in Sydney, actors agreed to collaborate but invested few resources. Over time, as trust levels between the government and DBSS enterprises grew, both parties gradually invested more resources (financial, logistical, political and legal) in the CG scheme. The NSW State Government, for instance, eventually gave legal support to the municipal (or local) government CG schemes by creating the *Share Bikes Impounding Amendment Act*. This empowered local governments in Sydney to address the disorderly parking (or dumping) of bikes under a new, mandated code of practice recognised by DBSS enterprises.

## **6.5 Concluding discussion**

Global researchers, urban policymakers, and practitioners have already recognised that CG is a sophisticated solution for addressing the dilemmas of governing the sharing economy in diverse contexts.

This commentary – drawing on case studies of the governance of DBSS in specific global cities – reveals the central role that power relations play in shaping the governance of any urban sharing economy. The nature of the power relations in CG schemes (which are increasingly used to govern and regulate the sharing economy in international urban contexts) determines how stakeholders engage, what motivates them to participate, and what capacity they have to promote collaboration.

It is never as simple as saying that an authoritarian CG is “better” or “worse” than a self-organised CG. Both forms of power arrangement and sharing have advantages and disadvantages. What is important is to pay close attention to how these differences in power relations encoded in each mode of CG play out in the practical collaborative work of governments and companies. It is these fine-grained insights (informed by real-world practice) that we hope will be useful to other CG researchers, planners and policymakers, and will contribute to the advancement of knowledge across all of these overlapping communities.

Centralised power relations have the benefit of enabling the dominant actor (usually the government) to rapidly mobilise access to administrative, financial and legal resources. This is in keeping with the research findings of Provan and Milward (1995),

who note that within a government-dominated, centralised collaboration, the capacity to leverage resources is enhanced. This kind of central authority is useful – and sometimes necessary – in addressing urgent problems posed by the sharing economy (such as the illegal parking or dumping of bikes in shared urban spaces within bike-sharing schemes), as actors don't have to spend too much time or effort to reach agreement or make decisions (Ran and Qi, 2018).

Our findings, however, also support those of Cao et al. (2022), who have shown that there are other potentially negative impacts of a centralised power system in any CG regime, such as not encouraging independent innovation by private actors in a weaker position, or less meaningful collaboration between stakeholders.

Establishing decentralised power relations is a useful strategy used in self-organising CG to cultivate trust among actors, and can lead to a more sustainable governance regime in the long run. This insight is confirmed by the empirical research on shared garbage management in Dortmund, Germany by Barile et al. (2021). They found that a broadly inclusive and participatory process is useful in fostering sustainable governance practices. For CG schemes that are intended to operate over the long-term, sharing power, negotiating equal leadership, and fostering trust among actors are key to healthy collaboration.

Power-sharing in CG may not, however, always lead to agreement. To the contrary, power-sharing can often extend the amount of time and resources all actors have to invest to take meaningful action. This finding is supported by research published by

Wang et al. (2020), who note that if a CG framework has no dominant leader, the collaboration requires much more effort to carry out effective joint actions and achieve success.

## **6.6 Broader implications**

Our findings have far-reaching implications both theoretically and practically, and we hope that these can be applied in practice to improve the future CG of any urban sharing economy.

By focusing on the influence of power relations in determining how CG actors engage and interact, this paper presents a relatively new theoretical perspective that has not yet been explored in CG theory related to the sharing economy. We challenge a theoretical hypothesis about the evolution process of CG in some of the existing literature, where an actor's willingness or ability to engage is seen as the key factor and necessary first step of CG, and is assumed to naturally foster shared motivation and, in turn, the capacity for joint action (Emerson et al., 2012; Ma et al., 2018; Cao et al., 2022). Our findings suggest that the capacity for joint action within authoritarian CG schemes is, in fact, often pre-determined by existing power relations, which strongly influence whether an actor is likely to engage, or whether shared motivation can be cultivated.

From a practical perspective, our findings have clear implications for urban governance policy and practice in the growing sharing economy, especially in relation

to three key collaborative dynamics (engagement of actors; actors' motivation to collaborate; and the capacity of actors to take joint action).

Firstly, we have highlighted how authoritarian CG schemes have the advantage of being able to rapidly mobilise key resources, and thus fast-track collaboration processes. Yet these hierarchical schemes (which often mandate rather than invite engagement from actors) can also hinder trust-building between actors, and stifle incentives for innovation and resource investment by private companies. We offer a suggestion to enhance the efficiency of these collaborations: authoritarian CG schemes should incorporate equitable negotiation and shared decision-making, even if the power dynamic is in the government's favour. The benefits are that private enterprises become more motivated to stay involved, and have the incentive to contribute resources (logistical and financial) to the overall CG scheme.

Secondly, we have shown that self-organising CG schemes have the advantage of encouraging actors to engage in an equitable and transparent manner, which is useful in building and maintaining trust. However, we have also noted that this decentralised approach to collaboration does not always lead to agreement, and sometimes discourages actors from mobilising key resources in the early stages of collaboration. We recommend that government actors in self-organising CG learn from this and play a more active role in mobilising policy, legislative and financial resources to support the governance regime in a timely fashion, while concurrently developing mediation and conflict resolution mechanisms to ensure that decisions or actions aren't stalled unnecessarily.

## **6.7 Research limitations and future research agenda**

By acknowledging that our research on how power relations between actors affect the CG of a sharing economy is by necessity limited, we hope to inform and guide the design of future sharing economy research that could fill these gaps.

Our research only considers power relations between two major actors (local governments, and DBSS enterprises) in DBSS governance. Future research could focus on the power distribution modes and CG schemes among other groups of actors, such as the cross-boundary collaborations between volunteers, university think-tanks, public medias, DBSS users, and industry associations.

Our findings are also informed by a close case study of only one sharing economy domain, namely DBSS, and thus do not cover all possible power relations and interactive engagement among actors in the governance of other urban sharing economies. Future research could focus on comparing and contrasting the impacts of power relations on the CG of a broader range of shared urban economy initiatives, from the sharing of goods and services (Barile et al., 2021) to the increasingly widespread practice of sharing homes, cars, farmland, food delivery, pets, and even urban knowledge (such as maps or preferred urban routes or spaces) (Ryu et al., 2019).

### **Competing interests**

The authors declare no competing interests.



**Ethical statement**

This article does not contain any studies with human participants performed by any of the authors.

**Informed consent**

This article does not contain any studies with human participants performed by any of the authors.

**Data availability**

Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.

**Additional information**

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## **6.8 Comparative analysis of Nanjing and Sydney's DBSS programs**

In the previous section, we discussed in detail how power relations – as the most important element of system context in Emerson et al. (2012)'s Integrative Framework for Collaborative Governance – affect and shape the particular form that CG of DBSS has taken in Nanjing and Sydney. In the following sections, I will share key research findings related to some of the other core theoretical elements of Emerson et al. (2012)'s CG framework. I'll start by expanding further on certain system context factors, and also consider drivers, collaborative dynamics, and outcomes and adaptations.

### **6.8.1 System context**

In **Chapters 4 and 5** of this thesis, I delineate the theoretical elements proposed by Emerson et al. (2012) as being useful tools of analysis in understanding forms of collaborative governance. System context is one of the factors that strongly influence any CG regime, and I've already discussed how power relations between actors set the scene for particular modes of CG.

Yet in Emerson et al. (2012)'s framework, system context includes another five variables: service conditions, conflict history, socio-economic and cultural characteristics, network, and policy and legal framework. These contextual factors together determine whether a CG scheme will be enabled or hindered in a particular

place and time. The impact of these factors on the CG scheme has not been reported in prior DBSS literature.

In terms of my comparative case study of CG of DBSS in Nanjing and Sydney, there are some similarities in the underlying system context (see **Chapters 4 and 5**). Both cities, for instance, are located in economically well-developed regions of their respective countries (China and Australia). Both cities have a reputation as leaders in urban governance innovation within their countries, and both have a long track record of public-private collaboration experience and advanced public management capabilities. The government officials of both cities were open to initiating positive policies to support the launch of DBSS programs. Still, they both also lacked clear and enforceable DBSS-related laws and legislative procedures (especially in the early stages). This resulted in some institutional uncertainty and undermined the CG schemes in both Nanjing and Sydney at certain points in the public-private collaborations.

There was some history of conflict between government and DBSS enterprise actors in both contexts in the months leading up to the establishment of the CG schemes. The conflict in Nanjing – where DBSS fleets are much larger than in Sydney – was more severe and difficult to manage. The ability of actors to quickly and successfully mediate their conflicts in both city contexts was hampered by the fact that DBSS services were relatively new at the time (as were the enterprises launching them). As such, key

relevant stakeholders in both cities – including local government and DBSS enterprises – had not yet established close networks before the collaboration began, and were not familiar with each other’s ways of thinking or operating.

The most significant (and noticeable) differences in the system context of Nanjing and Sydney are due to each city's varied socio-economic and cultural characteristics. As described in **Chapter 4**, Nanjing’s urban culture is driven by an entrenched ethos of collective Confucianism and socialist political traditions (Brown et al., 2012). While entrepreneurial partnerships and public-private linkages have increased in Nanjing in the past few years, such partnerships remain highly regulated by a current rigid, bureaucratic governance structure. Sydney’s socio-economic context (as discussed in **Chapter 5**) instead emphasises liberalism, ‘free market’ economics (Liu et al., 2016), and democratic participation in government.

These cultural differences fundamentally affect the dynamic between government and enterprise, and shape the distinctive forms, collaboration processes, and outcomes of the CG schemes in each city (as mapped out in Table 15).

**Table 15** Comparison of system context factors (not including power relations) affecting the CG of DBSS in Nanjing and Sydney

<b>Dimension</b>	<b>Sub-variables</b>	<b>Nanjing</b>	<b>Sydney</b>
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System context	Service conditions	<ul style="list-style-type: none"> <li>• Condition: three DBSS companies introduced more than 320,000 shared bikes across six major districts.</li> <li>• Challenges: oversupply of bikes, illegal parking, and a lack of sufficient maintenance staff.</li> </ul>	<ul style="list-style-type: none"> <li>• Condition: three DBSS companies introduced about 10,000 shared bikes across six local councils.</li> <li>• Challenges: vandalism, illegal parking, and a lack of sufficient maintenance staff.</li> </ul>
	Conflict history	Severe conflict	Severe conflict in some areas
	Socio-economic and cultural characteristics	Nanjing is located in a wealthy coastal region of China. Its local government is a leading urban governance innovator in China, with strong public management capabilities.	Sydney, one of the most economically developed cities in the world, has many active and overlapping for-profit and non-profit/public good communities. Its local governments have deep experience in public-private collaborations.
	Network	Not observed	Not observed
	Policy and legal framework	Policy direction and government strategies support DBSS and CG, but clear legislation is still lacking.	Policy direction and government strategies support DBSS and CG, but clear legislation is still lacking.

## 6.8.2 Drivers

As presented in **Chapters 4 and 5** of this thesis, my research findings recognise that each of the four key drivers identified by Emerson et al. (2012) – including initiating leadership, consequential incentives, interdependence, and uncertainty – were evident as the CG schemes in both Nanjing and Sydney were being developed. In Table 16, I have mapped out some of the similarities and differences in the key drivers leading to CG of DBSS in both cities, and will discuss these in greater detail in the following sections.

**Table 16** Comparison of key drivers of CG in Nanjing and Sydney’s DBSS

<b>Dimension</b>	<b>Sub-variables</b>	<b>Nanjing (Authoritarian CG)</b>	<b>Sydney (Self-organised CG)</b>
Drivers	Uncertainty	There is significant uncertainty (especially on the part of DBSS companies) about DBSS operation and management in Nanjing.	There is significant uncertainty about DBSS operation and management in Sydney. This uncertainty is exacerbated by the fact that the DBSS companies operating in the Sydney market are all headquartered overseas, and have limited experience of running DBSS in an Australian context.
	Interdependence	Actors recognised that effective governance	Actors recognised that the complex

		of DBSS was dependent on both government and industry, and could not be addressed or resourced by one sector alone.	governance issues related to DBSS could not be resolved alone, and that both government and enterprise would need to share the risk.
	Initiating leadership	Government-dominated	Shared equally between government and private companies
	Consequential incentives (namely, the most direct drivers that initiated the CG of DBSS)	<ul style="list-style-type: none"> <li>• The significant adverse impacts that DBSS had on the ability of the city to function immediately after they were launched.</li> <li>• The pressure of competitive political performance between structurally equivalent government officials/peers.</li> </ul>	<ul style="list-style-type: none"> <li>• The significant negative impacts posed by DBSS to the urban public order after the first schemes were launched.</li> </ul>

As Table 16 shows (and as per the presentation of both case studies in **Chapters 4 and 5**), Sydney and Nanjing share similar features with respect to the drivers of uncertainty and interdependence. Government and enterprise actors in both cities recognised, once DBSS had launched, that these new schemes had created many uncertainties around urban governance, including operations, regulation and policymaking. The uncertainty surrounding Sydney's DBSS was partly because its DBSS services were operated by

overseas-based enterprises unfamiliar with the Sydney market or the wider Australian regulatory environment.

As interviewees from both cities indicated, this awareness of the possible perils of the uncertainty surrounding DBSS made both government and enterprise representatives realise fairly quickly that no single organisation could handle DBSS governance issues alone, and thus prompted them to acknowledge the need to collaborate. This demonstrates that uncertainty and interdependence between actors can significantly facilitate both authoritarian forms of CG (as in Nanjing), and self-organised forms of CG (as in Sydney).

My research findings also confirm that two other common drivers of CG (consequential incentives and initiating leadership) were important in enabling government and private enterprises to engage in CG schemes responsible for co-governing DBSS. However, these took quite a different form in each city.

In terms of differences in the consequential incentives, the strongest incentive for governments and DBSS enterprises in Sydney to collaborate was the challenges to general urban order and governance posed by DBSS (and the resulting public outcry) (see **Chapter 5**). By contrast (and as noted in **Chapter 4**), in Nanjing, while the chaos and disorder created by DBSS in public spaces was a key driver of the eventual



collaboration, political factors were equally powerful incentives that triggered the CG scheme. This feature was also reported by some earlier CG research (Wang and Yin, 2012; Wang et al., 2020) on urban public services, including DBSS, in Chinese cities. **Chapter 4** found that both government and enterprise actors in Nanjing made a series of initial trade-offs before realising they could best achieve their mutual interests through collaboration. Government officials could gain political kudos and career promotion for their achievements by collaborating with DBSS enterprises, and DBSS enterprises could enjoy monopolistic benefits and survive in Nanjing's competitive DBSS market.

The research findings presented in **Chapters 4 and 5** show that there were also significant differences between both cities concerning *initiating* leadership. The self-organised CG of Sydney's DBSS was co-initiated by governments and DBSS enterprises. In Nanjing's authoritarian CG, however, the collaboration was mainly initiated by local government officials.

As indicated earlier (in sections 6.1 to 6.5), these observed differences in initiating leadership between the two case studies are mainly linked to the fundamental difference in traditional governance structures and power relations between the government and enterprise actors.

In **Chapters 4 and 5**, I have explored the contextual factors behind the distinctive power relations in each city. In Sydney, governments and private enterprises usually maintain a relatively equal relationship in terms of taking responsibility for resolving urban public issues, and both enjoy a certain discursive legitimacy as a result. Nanjing, however, is governed by a centralised government. When addressing general urban governance issues, the private partner is always an ‘invited assistant’ to the local government. As a result, government agencies often act as conveners and leaders of collaborative processes of urban governance.

### 6.8.3 Collaborative dynamics

The discussion and analysis of both case studies (as presented in **Chapters 4 and 5**) provides insight into the collaborative dynamics (including principled engagement, shared motivations, and capacity for joint actions) underpinning the CG of DBSS services in Nanjing and Sydney. In Table 17, I’ve mapped out some similarities and differences in the collaborative dynamics of the CG regime each city developed.

**Table 17** Comparison of the collaborative dynamics of the CG of Nanjing and Sydney’s DBSS

<b>Dimension</b>	<b>Sub-variables</b>	<b>Nanjing (Authoritarian CG)</b>	<b>Sydney (Self-organised CG)</b>
Principled engagement	Discovery	Shared interests and a common goal were discovered: to ensure the	Shared interests and a common goal were discovered: providing

		long-term, sustainable, and ordered development of DBSS.	safer, sustainable, widely accessible bike-share facilities to the community.
	Definition	Each actor acknowledged their responsibilities and obligations.	Local councils and DBSS companies made clear their responsibilities and obligations, but the NSW Government did not at first have a clear role.
	Deliberation	Multi-round negotiations took place but were government-dominated; the government was not always open to compromising.	Multi-round negotiations took place that were fair and inclusive and co-led by government and private companies.
	Determination	Many decisions were made, but some were unilateral (related to governmental “political tasks”).	Few substantive decisions were made, but most decisions were made through a consensus-based approach.
Shared motivation	Trust	Low-level mutual trust	High-level mutual trust
	Mutual understanding	Achieved only when in service of government goals.	Genuine mutual understanding between actors.
	Internal legitimacy	Strong, but based mostly on the administrative authority of local governments.	Low legitimacy in terms of being able to deliver on commitments, but high

			levels of trust between actors.
	Commitments	Most commitments were mandatory and were thus met in a timely fashion.	Actors made some shared commitments, but these were voluntary or ‘in principle/on paper’ (rather than mandatory) and thus many were not met over time.
Capacity for joint action	Procedural and institutional arrangements	<ul style="list-style-type: none"> <li>• Municipal level: delivered the ‘<i>Guiding Opinion</i>’ on DBSS</li> <li>• District level: various management policies.</li> </ul>	<ul style="list-style-type: none"> <li>• State level: <i>The NSW Share Bikes Impounding Amendment Act</i></li> <li>• Local level: created ‘<i>The Guide,</i>’ which was shared by an alliance of local councils.</li> </ul>
	Leadership	Government-dominated structure	Local governments and DBSS companies shared leadership, but the NSW Government did not initially assume leadership responsibility.
	Knowledge	Stakeholders were active in knowledge-building activities (such as field trips, academic symposia, and multi-stakeholder meetings).	Stakeholders were very active in knowledge-building activities (such as multi-stakeholder workshops, and seeking external help from professional consulting companies).

	Resources	The government actors had strong capacity to mobilise resources in support of the CG regime. DBSS companies tended not to take the initiative on this front, supporting government resource-leveraging efforts rather than becoming active ‘contributors.’	In the beginning, there was limited capacity for governments and DBSS companies to mobilise resources. As mutual trust levels increased, however, both actors began to mobilise some resources.
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### 6.8.3.1 Principled engagement

As discussed in **Chapters 4 and 5**, the collaborative dynamics proposed by Emerson et al. (2012) constitute the first theoretical elements or steps that can start to turn the ‘wheel’ of CG. One of the most significant is principled engagement between actors (including the discovery, definition, deliberation and determination of what the CG will look like). My case studies of Nanjing and Sydney’s collaboratively governed DBSS reveal similarities and differences across all of these elements of CG.

In terms of discovery, government and enterprise actors in both CG schemes (Nanjing and Sydney) found that they had shared interests and common goals. Both sets of actors believed that the sustainable development of DBSS could bring real benefits to cities, private enterprises and citizens. CG thus became an appealing proposition once actors discovered it could be a viable solution to the urban governance problems caused by

DBSS. This discovery period was crucial in confirming actors' common interests and goals in both authoritarian and self-organised CG schemes.

As for the definition of what CG might mean, government and DBSS enterprises in Nanjing clarified their responsibilities and obligations upfront. In this authoritarian CG, participation was mandatory, requiring a clearer and more stringently defined set of roles.

In Sydney's self-organised CG of DBSS (as discussed in **Chapter 5**), however, the roles and responsibilities of government actors were only initially made clear at the local government level. The NSW State Government did not clearly define their responsibilities within the CG of Sydney's DBSS. Since participation in this kind of self-organised CG scheme is voluntary rather than mandatory, not all actors chose to engage in the collaboration at the beginning. In the Sydney case study, the self-organised nature of the CG regime meant that not even government actors (such as the NSW State Government) always felt compelled to participate, raising the risk of the 'vacancy phenomenon' within key roles in the CG.

The CG of DBSS in both cities shows significant differences in deliberation and determination processes. Local government officials and higher authorities in Nanjing heavily intervened in and dominated these processes, which is common in an

authoritarian CG regime. As the empirical evidence shows in **Chapter 4**, more equitable forms of collaboration were only allowed when these did not interfere with the Nanjing government's political goals. Private enterprise actors were sometimes not even privy to how decisions were being made, much less to equal negotiation.

By contrast, actors' engagement in Sydney's self-organised CG was more open, transparent and inclusive. The negotiation and decision-making processes were consensus-based, with equal input from government and enterprise actors. As a result, Sydney's self-organised CG scheme had relatively high levels of power-sharing. It was not unduly influenced by political or administrative intervention from stronger actors or external forces, as was the case in Nanjing's CG. The CG regime created in Sydney for its DBSS was thus closer than Nanjing to an essential tenet of CG theory: that all actors need to stand on equal footing in deliberation and determination processes.

#### **6.8.3.2 Shared motivations**

My research findings in **Chapters 4** and **5** have shown the significant differences between the two cities when it comes to the principles of having shared motivations (including trust, mutual understanding, internal legitimacy and commitment) to sustain a CG regime, as proposed by Emerson et al. (2012).

As discussed in these previous chapters, actors' motivations to collaborate in the authoritarian CG of Nanjing's DBSS were strongly influenced by a political trade-off that stemmed from the interdependence of government and enterprise's political and economic interests, rather than from collaboration built through trust and mutual understanding.

The discussion in **Chapter 4** shows that the general dependence of DBSS enterprises on the Nanjing government for key resources resulted in these companies having an undisguised preference for maintaining a positive attitude towards collaborations with the government and accepting a series of mandatory actions led by the latter. Ran and Qi (2018) note that if actors expect that the benefits in collaboration will outweigh the cost of giving up some power or leaving the collaboration, they are more likely to tolerate a certain degree of disparity in power relations. This is a phenomenon particular to China's urban political context, and sets Nanjing's CG of DBSS apart from its Australian counterparts.

For their part, government officials involved in the CG of Nanjing's DBSS were motivated to sustain the collaboration because they rely on support from DBSS enterprises to achieve their political and career goals. Actors' recognition of the legitimacy of the authoritarian CG scheme was thus high from the start because the CG regime was convened by government representatives who provided a political and legal



basis of authority for the CG. In China, exercising government authority in this way is a socially acknowledged, legitimate political process (Purdy, 2012).

By contrast, Sydney's self-organised CG of DBSS regime, emphasising power-sharing and equitable engagement, helped government and enterprise actors cultivate shared motivations. These motivations to participate – for both government and DBSS companies – were strongly influenced by long-term trust-building exercises, and mutual understanding and respect between actors, rather than by government authority and mandatory commitments. Actors gradually became more inclined to recognise the legitimacy of the CG scheme in Sydney as levels of trust between actors grew. Hence, while shared motivations were observed in both Nanjing's authoritarian CG and Sydney's self-organised CG, the substance of these motivations was extremely different in each context.

### **6.8.3.3 The capacity for joint actions**

The capacity for joint actions – as defined by Emerson et al. (2012) – depends on four interlinked factors: institutional arrangement, leadership, knowledge, and resources. In the CG of Nanjing and Sydney, far more differences than similarities became apparent in relation to these factors, resulting in a varied capacity for joint actions by CG actors in each city.

The discussion in **Chapter 4** has already made clear that Nanjing's authoritarian CG regime had strong institutional innovation, resource-mobilising, and leadership capabilities. This is because the government was considered to be the CG leader, to control key resources the CG needed to succeed, and to be strongly motivated to maintain an effective collaboration to achieve political goals. As a result, these capabilities for joint action between government and enterprise were quickly established; some (such as leadership structure and macro-governance rules) were even pre-set before the collaboration began.

By contrast (as discussed in **Chapter 5**), institutional innovation and resource-mobilising within the CG of Sydney's DBSS were not very strong, particularly in the early stages of the collaboration. Since the capacity for joint actions in Sydney's CG scheme depended on trust-building and achieving consensus, these capacities took time to develop.

This comparison indicates that the authoritarian CG scheme in Nanjing had obvious advantages over Sydney's self-organising CG, in terms of the capacity to motivate institutional innovation, establish clear leadership, and mobilise resources. Despite these differences, actors in both forms of CG were active in knowledge-building. For instance, DBSS actors in Nanjing organised field visits and academic symposia. By

contrast, DBSS actors in Sydney organised workshops and sought out technical advice from leading international consulting firms (see **Chapters 4 and 5**).

#### 6.8.3.4 Collaborative outcomes and adaptations

The discussion and analysis of both cases (as presented in **Chapters 4 and 5**) reveal fundamental differences in collaborative outcomes and adaptations of CG schemes in Nanjing and Sydney, as mapped out in Table 18.

**Table 18** Collaborative outcomes and adaptations of Nanjing and Sydney’s DBSS

<b>Dimension</b>	<b>Sub-variables</b>	<b>Nanjing (Authoritarian CG)</b>	<b>Sydney (Self-organised CG)</b>
Action	N/A	Effective in carrying out collaborative actions.	Ineffective in carrying out collaborative actions.
Outcome	N/A	Initiating the collaboration, establishing communication platforms, refining management policies, and improving the governance of DBSS.	Establishing the communication mechanisms, formulating management rules, and gradually improving the governance of DBSS.
Adaptation	N/A	Power-sharing was promoted, but reliance on government and their central role in CG continued to be the governing principle. The CG’s sustainability	The process of cultivating trust was slow, but more conducive to sustaining the CG in the long run. The NSW State Government eventually

		remained constrained by the hierarchical power relations within the collaboration, and the low levels of trust.	became more involved once trust levels were high.
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As discussed in **Chapters 4 and 5**, the authoritarian CG of Nanjing’s DBSS generated multiple collaborative outcomes and actions over time. The government firmly established their leadership from the beginning, and was able to mandate enterprise actors to participate in each type of joint action the CG initiated. By contrast, the self-organised CG of Sydney’s DBSS could only carry out a few collaborative actions and outcomes over its existence.

These findings point to a real conundrum in terms of the elements that make a CG effective. The Sydney case study demonstrates that without a strong leader, achieving successful collaborative outcomes often requires more effort and time – but actors build trust as they share power. The Nanjing case study proves that CG schemes – even if they’re based on collaboration – can benefit from having a dominant leader with adequate power to convene stakeholders (and ensure they follow through on any promised actions and outcomes). An authoritarian CG scheme like the one in Nanjing can thus make collaboration processes work smoothly and effectively, and achieve measurable success. These findings confirm the arguments of Wang et al. (2020) who

emphasise that if government organisations lead a CG scheme, it is more likely to succeed.

Yet this thesis research has contributed some additional insights about collaborative adaptations. For instance, a self-organised CG like the one in Sydney has a better chance of long-term survival than more authoritarian forms of CG. While it was initially difficult for Sydney's CG to rack up rapid 'early wins,' over time, as trust was gradually fostered between government and enterprise actors, other powerful actors (including the NSW State Government) joined the CG scheme and actively promoted and strengthened the collaboration process.

In Nanjing, while some positive collaborative adaptations were at first observed, it was more difficult for the authoritarian CG to sustain the partnerships over time. Governments of several administrative districts in Nanjing (such as Qixia District) began to delegate some power to enterprises to deepen the partnership and enhance participation after seeing the success of early actions. However, the overall CG remained committed to government intervention, control, and over-reliance on government leadership. This kind of arrangement can hinder long-term collaboration, creating inter-organisational suspicion and resentment, and leading to the collapse of the CG scheme. When actors believe that they deserve a seat at the table (Purdy, 2012), collaborations are more likely to be sustained in the long run.

## **6.9 Broader implications of these research findings**

My thesis research project has considered the CG of DBSS through both an empirical and theoretical framework. My findings have broader implications for the field in terms of demonstrating how CG has been put into practice on the ground (in two global cities), and comparing and contrasting these practical insights through the prism of more general theory on the tenets and principles of CG.

### **6.9.1 Theoretical implications**

#### **6.9.1.1 Extending the scope and applications of broader CG theory**

Existing CG literature often deems it essential that actors entering any collaboration are considered equal (Swyngedouw, 2005), or calls on decision makers and practitioners to reduce their reliance on traditional forms of authority or hierarchical power relations. This means that the existing CG literature is not well-suited to deeply examining or understanding the characteristics and mechanisms of CG in strong-government societies such as mainland China (Yang, 2017).

This research fills that significant gap by applying existing CG theory and testing assumptions about what is essential for CG to work using a real-life case study of CG in practice in Nanjing, China. This makes an important contribution to the broader CG literature by extending the scope of our theoretical and empirical understandings of the

diversity of CG in non-Western contexts. My research has confirmed that the concept of CG – while originating from Western understandings of best practice in urban governance – is a useful framework for understanding innovative forms of urban governance in Chinese cities.

A major contribution my research makes is the insight that – to work in practice – CG does not always have to emphasise equal partnerships and power-sharing. The latter are concepts that are not necessarily valued to the same degree in China, where government actors play a strong role in leading any collaborations with private enterprises, in part due to the institutional legacies of the country’s political history (Jing, 2015). This thesis provides robust empirical evidence that the Chinese ‘strong government’ tradition can *also* be compatible with CG, but that this kind of authoritarian CG will necessarily have different processes, dynamics, drivers, and underlying principles.

#### **6.9.1.2 The role of trust in the CG of an urban sharing economy**

Existing CG literature (Dawes, 2003; Ansell and Gash, 2008; Jing, 2015) has tended to put forward the proposition that trust is a key – or essential – element in establishing and maintaining collaborative forms of governance, and that if there is no or low-level trust, there can be no collaboration. My research critiques and extends this proposition by comparing authoritarian CG and self-organised CG in two very different cultural contexts, with varying degrees of trust between actors.

My case study of Nanjing presents empirical evidence that collaboration does not require the presence of trust. An important research finding is that, in an authoritarian CG like Nanjing's, top-down administrative leadership and resource mobilisation can replace trust cultivation as the essential factor sustaining the collaboration. This is not to say that mutual trust isn't important to a collaboration in other urban (and especially Western) contexts: as my case study of Sydney confirms, high levels of trust can have a profoundly positive impact on CG schemes, by cultivating mutual regard and understanding between actors.

### **6.9.1.3 Testing, applying and extending the Integrated Framework for Collaborative Governance (Emerson et al., 2012)**

While some previous DBSS literature (Ma et al., 2018) has applied certain principles of Emerson et al. (2012)'s framework to Shanghai's CG of DBSS, not all of the theoretical elements that make up Emerson et al. (2012)'s framework have been systematically tested. Core principles (such as system context) and finer-grained variables (such as collaborative dynamics) have not been applied to real-world CG in practice; as a result, this research has provided only limited insights into how Emerson et al. (2012)'s framework might be useful or relevant to understanding urban governance of DBSS in global cities.



A major research contribution of this thesis is to fully test each of the theoretical elements of Emerson et al. (2012)'s framework in different urban governance contexts, by applying the framework to real-life CG in practice in Nanjing and Sydney. This expands the depth and breadth of the possible applications of Emerson et al. (2012)'s Integrated Framework for Collaborative Governance, but also highlights certain limitations of the framework in understanding CG in non-Western contexts.

My thesis research has confirmed the overall relevance of Emerson et al. (2012)'s Integrated Framework for Collaborative Governance as a means of conceptualising the CG of DBSS in cities in China and Australia. One of the research outcomes of this thesis has been to identify aspects of Emerson et al. (2012)'s Integrated Framework for Collaborative Governance that were important to the CG process in both Nanjing and Sydney.

However, a further research contribution made by this thesis is to question some of the long-held assumptions about CG processes in these overarching theoretical frameworks. Much of the existing theoretical literature on CG has emerged from governance studies in self-organised CG schemes within Western contexts. My research has shown that – while many of the theoretical tenets of what constitutes 'best practice' CG hold in an analysis of Sydney's CG of DBSS – these same tenets are not

always appropriate or relevant to understanding authoritarian forms of CG, such as the regime established to collaboratively govern Nanjing's DBSS.

As discussed earlier, Emerson et al. (2012)'s framework makes certain assumptions about what is essential to the success of CG: that the effective engagement of actors is the necessary first step of any collaboration; followed by the cultivation of shared motivation to continue to engage with one another across organisational divides (Emerson and Nabatchi, 2015), which is crucial to enabling actors to develop the capacity for joint actions. However, my case study of the CG of Nanjing's DBSS reveals that – within an authoritarian-style CG – the capacity for joint actions (such as institutional arrangements and government-dominated leadership) were pre-established before actors even began cultivating shared motivations to participate in a CG scheme.

Also, my thesis contributes to the wider field by suggesting some important modifications to – and extensions of – the Integrated Framework for Collaborative Governance (Emerson et al., 2012). My research findings indicate that the framework's international relevance could be bolstered by adding certain important theoretical variables to the category of system context for future DBSS researchers who might be studying CG in 'strong government' societies such as mainland China, or who might be conducting similar comparative case studies across various cultural contexts. As discussed in **Chapters 4 and 5**, system context should consider how CG schemes are

affected by the far-reaching influence of a bureaucratic political system, administrative culture, and traditional governance structures and institutions.

For the above reasons, I suggest that the Integrated Framework for Collaborative Governance Field (Emerson et al., 2012) could redefine the system context variables as open theoretical components, allowing researchers the freedom to fill in the sub-variables according to their specific research contexts. Each case study of CG has a unique suite of socio-political contextual factors that influence the form and nature of a particular CG scheme, and this flexibility would enable researchers to properly reflect the diversity of CG in practice.

### **6.9.2 Practice and policy implications**

The findings of this thesis may also be of use to policymakers and urban planning professionals in urban cities worldwide, whether they are trying to establish a CG regime for DBSS or any other kind of urban sharing economy service (or, in more extreme situations, where urban emergency management is necessary).

My research findings highlight certain advantages of authoritarian forms of CG, where local government plays a leading role in promoting collaboration, and supports it through the ability to mobilise key resources rapidly. Furthermore, an authoritarian CG's effectiveness is often due to government actors at all levels clearly being

identified as the final decision makers, and to clear conflict-resolving mechanisms being defined before the CG scheme is initiated.

My research findings may also be usefully applied to urban emergency management, or to urban governance of DBSS in situations where actors do not have the luxury of time to gradually build trust, but need to find a way to collaborate quickly and effectively. In these situations, the case study (presented in **Chapter 4**) of Nanjing's response to the problem of disorderly parked bicycles from the DBSS causing serious traffic jams is instructive. Government and enterprise actors had to respond quickly and efficiently, and could not afford to spend too much time or effort negotiating how the collaboration might unfold. A government-dominated leadership structure can also help to ensure that a CG scheme will serve the public interest first and foremost.

That said, my research findings from the Nanjing case study also highlight some potentially negative impacts of an authoritarian CG scheme. Nanjing's CG of DBSS was led by government, but also – at times – constrained by government. The administrative interventions by government actors made it very difficult to build trust or truth partnerships during the collaboration, which in turn impacted the long-term effectiveness and sustainability of the CG scheme. Excessive government intervention of this kind resulted in private DBSS enterprises in Nanjing only playing a limited or passive role in the collaboration, and made them less motivated to innovate.

For these reasons, it is important to keep in mind that authoritarian forms of CG, if they become the norm, do not lead to equitable participation in the governance of DBSS. In these kinds of CG, actors tend to assert their power to solve problems quickly and easily (Ran and Qi, 2019). Over time, this kind of CG scheme is not sustainable as a true collaboration, and its efficiency and outcomes are compromised in the long run.

The authoritarian form of CG developed between government and DBSS enterprise actors in Nanjing is thus, in part, a cautionary tale: it does not necessarily represent a promising new form of governance that can (or should) be replicated in other 'strong government' regions. My research findings suggest that to be sustainable, Nanjing's CG of DBSS regime needs to promote more balanced and equal partnerships between the government and DBSS enterprise actors (where the former is prevented from intervening too much with the activities of the latter). If local government actors in Nanjing can break from traditional ways of operating and established power hierarchies, they may find that the common goal of effective urban governance of DBSS is more quickly realised – with all the benefits this brings.

My research findings pertaining to Sydney's CG of DBSS confirm the advantages of a self-organised CG, which survives and thrives in the long term by motivating ongoing engagement by actors, power-sharing, and fostering trust. The sustainability of

Sydney's CG scheme was due to shared decision-making processes, and encouraging actors to believe in the internal legitimacy of the CG scheme by respecting and considering their diverse interests and perspectives. This inclusive approach helped all actors to recognise the CG scheme as useful, worthy and credible (Emerson and Nabatchi, 2015) in resolving urban DBSS issues, even if the process was time-consuming.

However, my Sydney case study also highlights the shortcomings of a self-organised form of CG. As previously discussed, self-organised CG depends on long-term processes of cultivating trust, and it thus may not be effective in situations needing a rapid and effective response. This bottom-up, consensus-based, voluntary approach to CG does not necessarily always lead to agreement, nor to implementing clear joint actions, due to its loose structure, unstable leadership structure and unclear conflict-resolving mechanisms.

A clearly defined leader – who wields strategic control – is sometimes necessary for a CG scheme to be successful (O'Flynn and Wanna, 2008). This kind of high-level political support and commitment have been identified as critical to effective public-private collaborations (Everingham et al., 2012). My research findings confirm that government authorities at both local and state levels need to play an active leadership role in any CG scheme from the earliest stages. Government actors also need to provide

macro-institutional and legal and policy guarantees to support any CG regime. In Sydney (as discussed in **Chapter 5**), local governments and DBSS enterprises would have benefited from NSW State Government-led policy, legislation, financial and technical resources, and the provision of clear mediation and conflict resolution pathways.

## References

- Aguilera, T., Artioli, F. & Colomb, C. (2021). Explaining the diversity of policy responses to platform-mediated short-term rentals in European cities: A comparison of Barcelona, Paris and Milan. *Environment and planning. A*, 53 (7), 1689-1712.
- Agyeman, J. & McLaren, D. (2017). *Sharing Cities: A Case for Truly Smart and Sustainable Cities*. Cambridge, Massachusetts: MIT Press.
- Ansell, C. & Gash, A. (2008). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research & Theory*, 18 (4), 543-571.
- Barile, S., Ciasullo, M.V., Iandolo, F. & Landi, G.C. (2021). The city role in the sharing economy: Toward an integrated framework of practices and governance models. *Cities*, 119, 103409.
- Brown, T.L., Gong, T. & Jing, Y. (2012). Collaborative Governance in Mainland China and Hong Kong: Introductory Essay. *International public management journal*, 15 (4), 393-404.
- Cao, J., Prior, J. & Giurco, D. (2022). Government and Private Company Collaboration in the Governance of Shared Mobility Schemes: A Case Study of Dockless Bike-Sharing Schemes in Sydney, Australia. *Sustainability*, 14 (20), 13141.
- Cao, J., Prior, J., Gu, D. & Giurco, D. (2022). How do government and industry engage in the collaborative governance of dockless bike-sharing schemes in Nanjing, China? *Urban Policy and Research*, 40 (3), 1-15.
- Chen, R., 2019. (2019). "Bike litter" and obligations of the platform operators: Lessons from China's dockless sharing bikes. *The computer law and security report*, 35 (5), 105317.
- Davidson, N.M. & Infranca, J.J. (2016). The Sharing Economy as an Urban Phenomenon. *Yale law & policy review*, 34 (2), 215-279.
- Dawes, S.S. (2003). *The Role of Trust in New Models of Collaboration*. New Models of Collaboration. Available via Center for Technology in Government.



[http://www.ctg.albany.edu/publications/online/new\\_models/essays/trust](http://www.ctg.albany.edu/publications/online/new_models/essays/trust).

Accessed 15 Jan 2003.

- Emerson, K. & Nabatchi, T. (2015). *Collaborative Governance Regimes*. Washington, DC: Georgetown University Press.
- Emerson, K., Nabatchi, T. & Balogh, S. (2012). An Integrative Framework for Collaborative Governance. *Journal of Public Administration Research & Theory*, 22 (1), 1-29.
- Everingham, J.-A., Warburton, J., Cuthill, M. & Bartlett, H. (2012). Collaborative Governance of Ageing: Challenges for Local Government in Partnering with the Seniors' Sector. *Local government studies*, 38 (2), 161-181.
- Hamari, J., Sjöklint, M. & Ukkonen, A. (2016). The sharing economy: Why people participate in collaborative consumption. *Journal of the Association for Information Science & Technology*, 67 (9), 2047-2059.
- Han, S.S. (2020). Co-producing an urban mobility service? The role of actors, policies, and technology in the boom and bust of dockless bike-sharing programmes. *International Journal of Urban Sustainable Development*, 14 (1), 1-16.
- Hauf, A. & Douma, F. (2019). Governing Dockless Bike Share: Early Lessons for Nice Ride Minnesota. *Transportation research record*, 2673 (9), 419-429.
- Jill, M.P. (2016). The role of power in collaborative governance. In: Margerum, R. & Robinson, C (ed.). *The Challenges of Collaboration in Environmental Governance*. Northampton, Massachusetts: Edward Elgar Publishing.
- Jing, Y. (2015. Introduction): The Road to Collaborative Governance in China. In: Y. Jing (ed.). *The Road to Collaborative Governance in China*. New York City: Palgrave Macmillan.
- Linder, S.H. (1999). Coming to Terms With the Public-Private Partnership: A Grammar of Multiple Meanings. *The American behavioral scientist (Beverly Hills)*, 43 (1), 35-51.
- Liu, T., Wang, Y. & Wilkinson, S. (2016). Identifying critical factors affecting the effectiveness and efficiency of tendering processes in Public–Private

- Partnerships (PPPs): A comparative analysis of Australia and China. *International journal of project management*, 34 (4), 701-716.
- Ma, Y., Lan, J., Thornton, T., Mangalagiu, D. & Zhu, D.J. (2018). Challenges of collaborative governance in the sharing economy: The case of free-floating bike sharing in Shanghai. *Journal of Cleaner Production*, 197, 356-365.
- Mehmet, S. (2020). *Shared E-Bike Services Trial Memorandum of Understanding*. City of Melbourne. Available via DIALOG. [www.melbourne.vic.gov.au](http://www.melbourne.vic.gov.au) of subordinate document. Accessed 15 Jan 2020.
- O'flynn, J. & Wanna, J. (2008). *Collaborative governance : a new era of public policy in Australia?* Canberra, Australian Capital Territory: ANU Press.
- Provan, K.G. & Milward, H.B. (1995). A Preliminary Theory of Interorganizational Network Effectiveness: A Comparative Study of Four Community Mental Health Systems. *Administrative science quarterly*, 40 (1), 1-33.
- Purdy, J.M. (2012). A Framework for Assessing Power in Collaborative Governance Processes. *Public administration review*, 72 (3), 409-417.
- Ran, B. & Qi, H. (2018). Contingencies of Power Sharing in Collaborative Governance. *American review of public administration*, 48 (8), 836-851.
- Ran, B. & Qi, H. (2019). The Entangled Twins: Power and Trust in Collaborative Governance. *Administration & society*, 51 (4), 607-636.
- Ryu, H., Basu, M. & Saito, O. (2019). What and how are we sharing? A systematic review of the sharing paradigm and practices. *Sustainability science*, 14 (4), 515-527.
- Swyngedouw, E. (2005). Governance Innovation and the Citizen: The Janus Face of Governance-beyond-the-State. *Urban studies*, 42 (11), 1991-2006.
- Tremblay-Huet, S., Scassa, T., Makela, F. & Mckee, D. (2018). *Law and the "Sharing Economy" Regulating Online Market Platforms*. Ontario, Ottawa : University of Ottawa Press.
- Van Waes, A., Farla, J. & Raven, R. (2020). Why do companies' institutional strategies differ across cities? A cross-case analysis of bike sharing in

- Shanghai & Amsterdam. *Environmental innovation and societal transitions*, 36, 151-163.
- Vith, S., Oberg, A., Höllerer, M.A. & Meyer, R.E. (2019). Envisioning the ‘Sharing City’: Governance Strategies for the Sharing Economy. *Journal of Business Ethics*, 159, 1023-1046.
- Wang, F. & Yin, H. (2012). A New Form of Governance or the Reunion of the Government and Business Sector? A Case Analysis of the Collaborative Natural Disaster Insurance System in the Zhejiang Province of China. *International public management journal*, 15 (4), 429-453.
- Wang, H., Chen, B., Xiong, W., Yang, L. & Zhu, D. (2019). Multiple Pathways to Public-Private Partnerships for Urban Public Service Delivery: A Cross-City Comparison of Bicycle-Sharing Service in China. *Urban Policy and Research*, 37 (4), 1-15.
- Wang, H., Xiong, W., Yang, L., Zhu, D. & Cheng, Z. (2020). How does public-private collaboration reinvent? A comparative analysis of urban bicycle-sharing policy diffusion in China. *Cities*, 96 (4), 102429.
- Yang, L. (2017). Types and Institutional Design Principles of Collaborative Governance in a Strong-Government Society: The Case Study of Desertification Control in Northern China. *International public management journal*, 4, 586-623.
- Zhao, D. & Wang, D. (2019). The Research of Tripartite Collaborative Governance on Disorderly Parking of Shared Bicycles Based on the Theory of Planned Behavior and Motivation Theories—A Case of Beijing, China. *Sustainability*, 11 (19), 11, 5431.
- Zhu, X. (2017). Inter-regional diffusion of policy innovation in China: A comparative case study. *Asian journal of political science*, 25 (3), 266-286.

# Chapter 7: Conclusions

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This chapter presents an overall summary of my thesis research, considers the implications (theoretically and practically) of the research findings, and notes some of the necessary limitations of the research design and methodology. It also provides recommendations to future scholars in terms of how research in this field could be extended in productive ways.

## 7.1 Summary of research design, approach and significance

This thesis research is grounded in an empirical, cross-cultural case study that provides practical insights into how CG schemes function in real-world contexts. My case studies of the CG of DBSS in both Nanjing and Sydney have generated new empirical insights, comparing and contrasting certain features of the complex relationships between government and private enterprise actors in different cultural contexts.

Using a methodology designed to collect primary and secondary data (including semi-structured interviews with various groups of DBSS actors, focus group discussions, and document analysis), this research provides in-depth, practical answers to many of the questions left unanswered in prior CG literature. This empirical data and broader research findings will be of use to CG researchers, policymakers, urban planners, and

communities seeking to understand how CG can be used to govern shared services in global cities in the new era of the sharing city.

Theoretically, this research has made a significant contribution by applying and testing certain principles from Emerson et al. (2012)'s Integrative Framework for Collaborative Governance. I have used these principles as a lens to parse and categorise the respective models of CG that emerged in Nanjing and Sydney: authoritarian CG, and self-organised CG. Informed by on-the-ground insights, my research thus deepens and extends existing theoretical frameworks that lay out the general conditions under which CG can thrive. Therefore, my findings will interest researchers who seek to fine-tune these kinds of generalised CG frameworks to ensure that they remain relevant to understanding how the urban sharing economy is governed differently in varied contexts worldwide.

An important contribution of this research is to trace the specific and unique trajectory of CG of DBSS in both a Chinese and Australian city, and to show how CG modes, practices and outcomes evolve and change over time. Other cities, regions and countries can learn important lessons from these case studies. The findings are relevant to governments and entrepreneurs worldwide who seek to undertake CG of any kind of urban sharing economy.

A systematic literature review informed my thesis project of topical debates within both the general literature on CG and on DBSS in global cities (as presented in **Chapter 2**). This allowed me to identify specific gaps in the research that my project undertook to fill. The first identified gap was that existing DBSS research only addressed the CG of DBSS at a superficial level. Very little of this research examined in-depth the actual components of CG that shape its real-world implementation and success, such as system context, collaborative dynamics, and collaborative outcomes.

A second identified gap was that the existing research lacked empirical studies from cities and regions outside China that could be used to better understand CG practices within different social, cultural and political contexts. A third gap was that most existing DBSS research lacked genuine theoretical underpinnings (or used analytical tools without broader theoretical support), damaging the credibility of the research findings. My research is unique in conducting a comparative analysis of the CG of DBSS practices in Nanjing and Sydney by applying (and evaluating) certain principles from the Integrative Framework for Collaborative Governance (Emerson et al., 2012).

## **7.2 Summary of research questions and findings**

I designed this thesis project to address four main research questions:

- **RQ1:** How did contextual factors (including drivers) affect the engagement of government and DBSS companies in the CG of DBSS in Nanjing and Sydney between 2017 and 2021?
- **RQ2:** How did government actors and DBSS companies dynamically interact within the respective CG frameworks guiding DBSS in Nanjing and Sydney between 2017 and 2021?
- **RQ3:** What collaborative outcomes and adaptations arose from government and DBSS company engagement in the CG of DBSS in Nanjing and Sydney between 2017 and 2021?
- **RQ4:** What are the implications of this research in terms of applying and testing certain principles from the Integrative Framework for Collaborative Governance – and how can the research findings contribute to the broader research field of DBSS governance?

To answer these questions, I carried out two empirical case studies (of Nanjing and Sydney’s CG of DBSS). I drew on primary data (in-depth, semi-structured interviews and focus group discussions) and secondary data (documentary analysis). A detailed discussion of my research questions and findings can be found in **Chapters 4, 5 and 6**. Below, I’ll provide a brief summary of my findings.

***RQ1:** How did contextual factors (including drivers) affect the engagement of government and DBSS companies in the CG of DBSS in Nanjing and Sydney between 2017 and 2021?*

This research has found that CG of DBSS programs in both Nanjing and Sydney emerged within specific contexts and were thus highly influenced by economic, social, political, and cultural factors. While existing CG literature has begun to note the importance of understanding contextual factors – such as political context (Newman et al., 2004), socio-economic context (Wang and Yin, 2012), and institutional environment (Bryson et al., 2006) – my research project is among the first to show how power relations between actors are highly influential in shaping what form CG takes in a particular city, and that power relations determine the nature of collaborative dynamics within any CG scheme.

My findings (as presented in **Chapters 4 and 5**) show that in Nanjing’s socio-cultural and political context, power relations between government and enterprise actors tend to be hierarchical and authoritarian. As a result, the CG regime created to govern Nanjing’s DBSS encoded unequal power relations between government and private enterprise actors. In Sydney, however, where the socio-cultural and political context emphasises liberalism and democratic participation, a different kind of CG regime emerged to govern DBSS: one that was self-organised, with power shared fairly equally



between actors. However, what I have emphasised in my findings is that neither form of CG was perfectly successful; in fact, each type of CG (both authoritarian and self-governing) has advantages and disadvantages.

In **Chapters 4** and **5**, I closely examine the key drivers that initiated the CG regime in each city, and found that all four drivers (uncertainty, interdependence, consequential incentives, and initiating leadership) identified by Emerson et al. (2012) were indeed factors that played a role in driving the establishment of CG of DBSS in Nanjing and Sydney.

My research is the first to identify that Sydney's self-organised CG was driven by 'exogenous pressure:' that is, by governance crises caused by new and unregulated DBSS schemes being set up in the city (see **Chapter 4**). Similarly, my research is the first to identify that Nanjing's authoritarian CG was instead driven by 'endogenous pressure' from CG actors (both government and DBSS enterprises), who initiated the CG regime based on considerations of their own political and economic interests (see **Chapter 5**). Moreover, my research found that Sydney's self-organised CG was co-initiated and led by all actors; whereas participation in Nanjing's authoritarian CG was mandated through policy created by government leaders (see **Chapters 4** and **5**).

***RQ2:** How did government actors and DBSS companies dynamically interact within the respective CG frameworks guiding DBSS in Nanjing and Sydney between 2017 and 2021?*

This research has analysed the collaborative processes and dynamics in Nanjing and Sydney's CG of DBSS using the fine-grained variables of collaborative dynamics identified by Emerson et al. (2012)'s CG framework. The findings presented in **Chapters 4 and 5** show that the CG engagement process in Nanjing was government-mandated and government-led, while in Sydney it was an equal and open participatory process.

In Nanjing, actors' engagement was determined by mandatory government requirements and by the acknowledged interdependence of political and economic incentives and aims. In Sydney, actors were motivated to engage in the CG based on long term trust-building, and a collaborative approach designed to build mutual respect (see **Chapters 4 and 5**). In terms of capacities for joint actions, Nanjing's authoritarian CG scheme had obvious advantages in terms of institutional innovation, leadership construction, and resource-mobilising, all of which are processes facilitated by strong government administrative command (see **Chapter 4**). Initially, these processes took much longer to happen in Sydney's more egalitarian CG – where shared leadership made it harder to rapidly make decisions, achieve consensus or mobilise resources –

but, as mutual trust between actors grew over the long term, these capacities gradually improved (see **Chapter 5**).

***RQ3:** What collaborative outcomes and adaptations arose from government and DBSS company engagement in the CG of DBSS in Nanjing and Sydney between 2017 and 2021?*

The empirical evidence presented in **Chapters 4** and **5** indicates that the authoritarian CG scheme in Nanjing allowed for faster and more effective joint actions, and enhanced the outcomes of those actions within a relatively short period. By contrast, Sydney's self-organised CG could not carry out successful joint actions or generate outcomes in the early stages of the collaboration (as these depended on longer term trust-building between actors).

Nanjing's authoritarian CG, however, faced other challenges: since participation in the CG scheme was mandatory, actors had lower levels of trust and reciprocity, which in turn constrained the outcomes and damaged the prospects of the CG regime surviving in the long run (see **Chapter 4**). By contrast, Sydney's self-organised model of CG – though it took longer to take collaborative actions – was more sustainable in the end, and more likely to survive due to the high levels of mutual trust between actors. As trust between actors (at the inter-personal and inter-organisational levels) was

strengthened and institutionalised through repeated interactions over time, there was less uncertainty regarding the CG regime being sustained into the future (see **Chapter 5**).

***RQ4:** What are the implications of this research in terms of applying and testing certain principles from the Integrative Framework for Collaborative Governance – and how can the research findings contribute to the wider research field of DBSS governance?*

Unlike the previous three research questions, which focus on the nuts and bolts of CG in practice, RQ4 concerns itself with CG theory. This question prompted me to test whether Emerson et al. (2012)'s Integrative Framework for Collaborative Governance – the only integrative analytical framework in the field of CG studies – is a useful tool for theoretical analysis in the study of CG practices in urban DBSS programs.

My research findings (see **Chapters 4 and 5**) fully confirm this framework's applicability, relevance and usefulness in analysing the CG practices of DBSS in urban centres. I also affirm that this framework can be used to study the conditions under which CG processes emerge and thrive to govern many kinds of urban mobility-sharing services in both the public and private sectors, such as car-sharing and scooter-sharing. The in-depth discussion of my findings (in **Chapter 6**) comprehensively evaluates this framework, and also puts forward some suggestions for modifications and

improvements so that it can continue to be relevant to all kinds of CG programs designed to govern the urban sharing economy.

### **7.3 Research limitations and future research agenda**

There are several necessary limitations of this research in terms of its design and scope. I draw attention to them here, so that future researchers in this field can build on, broaden and extend this research.

From an empirical perspective, this research is limited to only two case studies of CG models in different contexts (Nanjing and Sydney), and is thus unable to compare these examples to CG schemes in other regions of the world where DBSS have also been introduced. There is an opportunity for future researchers to carry out case studies of a broader cross-section and larger international sample of cities (since DBSS programs have been launched in more than 200 cities and regions across Asia, Europe, and North America).

Future case studies of CG of DBSS in other global cities, such as New York City, Singapore, and Amsterdam, will be crucial to understanding how CG evolves differently in varied contexts. One of my significant research insights is that there is no 'one size fits all' version of CG of DBSS; we need to closely observe and analyse CG in practice around the world to fully understand the diverse forms CG can take.

Another limitation of my research is that it only focuses on two groups of actors (government officials and representatives from DBSS companies) involved in the CG of DBSS. However, many different groups of actors participate in the CG of DBSS, including general urban residents, DBSS users, university think tanks, and industry associations.

For instance, in both Nanjing and Sydney, there are active user groups called ‘Bike Hunters,’ whose members collaborate with DBSS enterprises and use their spare time to help these companies manage shared bikes in urban streets, and thereby prevent public disorder. In return, DBSS enterprises give them monetary rewards. The omission of these actors’ participation in the CG of DBSS regimes of both cities is a limitation of this research. These kinds of civic and public partnerships should be the focus of future research investigating how multi-layered and complex collaborations govern urban DBSS.

The methodology used in this research was necessarily limited due to time, budget and other practical constraints. My research methods have been predominantly qualitative (interviews, focus group discussions, and document analysis). While I made efforts to include diverse data sources to triangulate the research findings, there might still be unforeseen errors due to a lack of quantitative data to confirm these findings. A further

limitation is that the empirical data I drew on for the Nanjing case study was all in Mandarin; some of the nuances of the meaning of Chinese terms may have been lost in translating them into English. Future researchers in this field should be encouraged to use qualitative *and* quantitative data collection methods (such as survey questionnaires) to cross-check the validity of any research findings.

Finally, while carrying out my Nanjing case study, I did not have the opportunity (as I did in Sydney) to interview key personnel within the CG of Nanjing's DBSS, such as high-level government officials and elite entrepreneurs. This somewhat limits my research findings, because I was not able to gain access to certain people in key decision-making roles, such as district mayors or founders of DBSS enterprises. This is a common and widespread challenge in doing any kind of empirical research in cities in mainland China. Future researchers should be encouraged to deliver richer empirical data by finding ways to gain direct access to high-level officials and entrepreneurs (such as municipal and district mayors, CEOs, and founders of DBSS enterprises).

## References

- Bryson, J.M., Crosby, B.C. & Stone, M.M., 2006. The Design and Implementation of Cross-Sector Collaborations: Propositions from the Literature. *Public Administration Review*. Malden, USA: Blackwell Publishing Inc, 44-55.
- Emerson, K., Nabatchi, T. & Balogh, S., 2012. An Integrative Framework for Collaborative Governance. *Journal of Public Administration Research & Theory*. Oxford University Press / USA, 1-29.
- Newman, J., Barnes, M., Sullivan, H. & Knops, A., 2004. Public Participation and Collaborative Governance. *Journal of social policy*, 33, 203-223.
- Wang, F. & Yin, H., 2012. A New Form of Governance or the Reunion of the Government and Business Sector? A Case Analysis of the Collaborative Natural Disaster Insurance System in the Zhejiang Province of China. *International public management journal*, 15 (4), 429-453.



# Bibliography

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- Agarwal, N. & Steinmetz, R. (2019). Sharing Economy: A Systematic Literature Review. *International Journal of Innovation and Technology Management*, 16 (6), 930002.
- Aguilera, T., Artioli, F. & Colomb, C. (2021). Explaining the diversity of policy responses to platform-mediated short-term rentals in European cities: A comparison of Barcelona, Paris and Milan. *Environment and planning. A*, 53 (7), 1689-1712.
- Agyeman, J. & McLaren, D. (2017). *Sharing Cities: A Case for Truly Smart and Sustainable Cities*. Cambridge, Massachusetts: MIT Press.
- Ansell, C. & Gash, A. (2008). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research & Theory*, 18 (4), 543-571.
- Ashqar, H.I., Elhenawy, M., Almannaa, M.H., Ghanem, A., Rakha, H.A. & House, L. (2017). Modeling bike availability in a bike-sharing system using machine learning. *5th IEEE International Conference on Models and Technologies for Intelligent Transportation Systems (MT-ITS)*, Naples, Italy, 374-378.
- Aviv-Reuven, S. & Rosenfeld, A. (2021). Publication patterns' changes due to the COVID-19 pandemic: a longitudinal and short-term scientometric analysis. *Scientometrics*, 126 (8), 6761-6784.
- Badiane, K., Xi, Z., Wui, W. & Bayala, V. (2020). Development of the Sharing Economy in China: The Interaction between Bike-Sharing and Urban Governance. *American Journal of Humanities and Social Sciences Research*, 4 (12), 23-42.
- Ban, S. & Hyun, K.H. (2019). Designing a User Participation-Based Bike Rebalancing Service. *Sustainability*, 11 (8), 2396.
- Barile, S., Ciasullo, M.V., Iandolo, F. & Landi, G.C. (2021). The city role in the sharing economy: Toward an integrated framework of practices and governance models. *Cities*, 119, 103409.

- Baxter, P. & Jack, S. (2015). Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers. *Qualitative report*, 13 (4), 544-559.
- Belk, R. (2010). Sharing. *Journal of Consumer Research*, 36 (5), 715-734.
- Bentrup, G. (2001). Evaluation of a collaborative model: a case study analysis of watershed planning in the Intermountain West. *Environmental management*, 27 (5), 739.
- Berends, L., Ritter, A. & Chalmers, J. (2016). Collaborative Governance in the Reform of Western Australia's Alcohol and Other Drug Sector: Reform of WA Alcohol and Other Drug Sector. *Australian journal of public administration*, 75 (2), 137-148.
- Bogdan, R. & Biklen, S. (2007). *Qualitative research for education: An introduction to theories and methods*. Ann Arbor, Michigan: Allyn and Bacon.
- Botsman, R. & Rogers, R. (2010). *What's mine is yours : the rise of collaborative consumption* (1st ed.). New York City: Harper Business.
- Brown, T.L., Gong, T. & Jing, Y. (2012). Collaborative Governance in Mainland China and Hong Kong: Introductory Essay. *International public management journal*, 15 (4), 393-404.
- Bryman, A. (2016). *Social research methods* (Fifth ed.). Oxford, England: Oxford University Press.
- Bryson, J.M., Crosby, B.C. & Stone, M.M. (2006). The Design and Implementation of Cross-Sector Collaborations: Propositions from the Literature. *Public Administration Review*, 66 (s1), 44-55.
- Caggiani, L., Camporeale, R., Ottomanelli, M. & Szeto, W.Y. (2018). A modeling framework for the dynamic management of free-floating bike-sharing systems. *Transportation research. Part C, Emerging technologies*, 87, 159-182.
- Cao, J., Prior, J. & Giurco, D. (2022). Government and Private Company Collaboration in the Governance of Shared Mobility Schemes: A Case Study of Dockless Bike-Sharing Schemes in Sydney, Australia. *Sustainability*, 14 (20), 13141.

- Cao, J., Prior, J., Gu, D. & Giurco, D. (2022). How do government and industry engage in the collaborative governance of dockless bike-sharing schemes in Nanjing, China? *Urban Policy and Research*, 40 (3), 1-15.
- Cao, J., Prior, J. & Moutou, C. (2021). The governance of dockless bike-sharing schemes: A systemic review of peer-reviewed academic journal papers between 2016 and 2019. *Cleaner Engineering and Technology*, 4, 100140.
- Chen, R. (2019). “Bike litter” and obligations of the platform operators: Lessons from China's dockless sharing bikes. *The computer law and security report*, 35 (5), 105317.
- Chen, S. & Wang, K. (2018). A study on local legislation for Bicycle-sharing from the perspective of the choice of legislative model. *Journal of Ocean University of China(Social Sciences)*, 31, 103-109. [In Chinese]
- Cheng, B.H. & Qi, F.Y. (2018). Government regulation of bike-sharing: an analysis framework -- based on the policy text analysis of 15 cities. *Academic Research*, 61, 62-67. [In Chinese]
- Combs, J. & Onwuegbuzie, A. (2010). Describing and Illustrating Data Analysis in Mixed Research. *International Journal of Education*, 2 (2), 1948-5476.
- Creswell, J.W. (2007). *Qualitative inquiry and research design : choosing among five approaches* (2nd ed.). Thousand Oaks, California: Sage Publications.
- Creswell, J.W. (2009). *Research design : qualitative, quantitative, and mixed methods approaches* (3rd ed.). Thousand Oaks, California: Sage Publications.
- Creswell, J.W. (2013). *Qualitative inquiry and research design : choosing among five approaches* (3rd ed.). Thousand Oaks, California: Sage Publications.
- Creswell, J.W. (2014). *Research design : qualitative, quantitative, and mixed methods approaches* (4th ed.). Thousand Oaks, California: Sage Publications.
- Curtis, S. K., & Mont, O. (2020). Sharing economy business models for sustainability. *Journal of Cleaner Production*, 266, 121519.
- Davidson, N.M. & Infranca, J.J. (2016). The Sharing Economy as an Urban Phenomenon. *Yale law & policy review*, 34 (2), 215-279.

- Davies, J.S. (2011). *Challenging governance theory From networks to hegemony*. Bristol, England: Policy Press.
- Dawes, S.S. (2003). *The Role of Trust in New Models of Collaboration*. New Models of Collaboration. Available via Center for Technology in Government. [http://www.ctg.albany.edu/publications/online/new\\_models/essays/trust](http://www.ctg.albany.edu/publications/online/new_models/essays/trust). Accessed 15 Jan 2003.
- De Villiers, C., Kuruppu, S. & Dissanayake, D. (2021). A (new) role for business – Promoting the United Nations’ Sustainable Development Goals through the internet-of-things and blockchain technology. *Journal of business research*, 131 (2), 598-609.
- Demaio, P. (2009). Bike-sharing: History, Impacts, Models of Provision, and Future. *Journal of Public Transportation*, 12 (4), 41-56.
- Dowling, R. & Kent, J. (2015). Practice and public–private partnerships in sustainable transport governance: The case of car sharing in Sydney, Australia. *Transport policy*, 40, 58-64.
- Du, M.Y. & Cheng, L. (2018). Better Understanding the Characteristics and Influential Factors of Different Travel Patterns in Free-Floating Bike Sharing: Evidence from Nanjing, China. *Sustainability*, 10 (4), 1244-1244.
- Eckhardt, G.M. & Bardhi, F. (2015). *The sharing economy isn't about sharing at all*. Available via Harvard Business Review. <https://hbr.org/2015/01/the-sharing-economy-isnt-about-sharing-at-all>. Accessed 28 Jan 2015.
- Emerson, K. & Nabatchi, T. (2015). *Collaborative Governance Regimes*. Washington, DC: Georgetown University Press.
- Emerson, K., Nabatchi, T. & Balogh, S. (2012). An Integrative Framework for Collaborative Governance. *Journal of Public Administration Research & Theory*, 22 (1), 1-29.
- Espinoza, A. (2017). California High-Speed Rail Project: Assessing Regional Differences Regarding the System Context and Collaboration Dynamics. Dissertation, The University of La Verne.

- Everingham, J.-A., Warburton, J., Cuthill, M. & Bartlett, H. (2012). Collaborative Governance of Ageing: Challenges for Local Government in Partnering with the Seniors' Sector. *Local government studies*, 38 (2), 161-181.
- Faghih-Imani, A. & Eluru, N. (2015). Analysing bicycle-sharing system user destination choice preferences: Chicago's Divvy system. *Journal of Transport Geography*, 44, 53-64.
- Fan, Y. (2018). The improvement of local laws and regulations on bike-sharing: a case study of normative documents in nine cities including Beijing. *Administration Reform*, 10, 52-56. [In Chinese]
- Fishman, E. (2016). Bikeshare: A Review of Recent Literature. *Transport Reviews*, 36 (1), 92-113.
- Fishman, E. (2019). *Bike Share* (1st ed.). Oxfordshire, England: Routledge.
- Fishman, E., Washington, S. & Haworth, N. (2013). Bike Share: A Synthesis of the Literature. *Transport Reviews*, 33, 148-165.
- Flynn, B.B., Sakakibara, S., Schroeder, R.G., Bates, K.A. & Flynn, E.J. (1990). Empirical research methods in operations management. *Journal of operations management*, 9 (2), 250-284.
- Fox, J., Murray, C. & Warm, A. (2003). Conducting research using web-based questionnaires: Practical, methodological, and ethical considerations. *International journal of social research methodology*, 6 (2), 167-180.
- Gan, H.W. & Lou, C.W. (2018). Research on reversing public-private partnership in public service: taking bike-sharing service as an example. *Inner Mongolia Social Sciences*, 39, 29-35. [In Chinese]
- Gao, J. (2009). Governing by goals and numbers: A case study in the use of performance measurement to build state capacity in China. *Public administration and development*, 29 (1), 21-31.
- Gao, Q. & Li, Z.H. (2018). Analysis of the collaborative governance of bike sharing based on SFIC model. *Science & Technology for Development*, 14, 39-43. [In Chinese]

- Garud, R., Kumaraswamy, A., Roberts, A. & Xu, L. (2022). Liminal movement by digital platform-based sharing economy ventures: The case of Uber Technologies. *Strategic management journal*, 43 (3), 447-475.
- Gibbs, G.R. (2007). *Qualitative Research kit: Analyzing qualitative data*. London, England: SAGE Publications.
- Gill, P. & Baillie, J. (2018). Interviews and focus groups in qualitative research: an update for the digital age. *British Dental Journal*, 225 (20), 668-672.
- Gu, L.M. & Zhang, Y.X. (2019). Sharing bike service governance from the perspective of coproduction: a hybrid method study on the case of Shanghai. *Journal of Public Management*, 16, 89-104. [In Chinese]
- Gu, T., Kim, I. & Currie, G. (2019). To be or not to be dockless: Empirical analysis of dockless bikeshare development in China. *Transportation research. Part A, Policy and practice*, 119, 122-147.
- Gu, Z., Zhu, Y., Zhang, Y., Zhou, W. & Chen, Y. (2019). Heuristic Bike Optimization Algorithm to Improve Usage Efficiency of the Station-Free Bike Sharing System in Shenzhen, China. *ISPRS international journal of geo-information*, 8, 239.
- Guan, H. & Lu, S. (2019). Scheduling model of free-floating bike-sharing considering Users' Participation. *Journal of Beijing University of Technology*, 45, 1050-1056. [In Chinese]
- Guest, G., Bunce, A. & Johnson, L. (2006). How Many Interviews Are Enough?: An Experiment with Data Saturation and Variability. *Field methods*, 18 (1), 59-82.
- Guo, G. (2007). Retrospective Economic Accountability under Authoritarianism: Evidence from China. *Political research quarterly*, 60 (3), 378-390.
- Guo, P., Lin, X.Z., Huang, Y., Tu, S.M., Bai, X.M., Yang, Y.W. & Ye, L. (2017). Sharing bike: collaborative governance in Internet technology and public services. *Journal of Public Management*, 14, 1-10. [In Chinese]

- Guo, Y., Yang, L. & Chen, Y. (2022). Bike Share Usage and the Built Environment: A Review. *Frontiers in public health*, 10, 848169-848169.
- Hamari, J., Sjöklint, M. & Ukkonen, A. (2016). The sharing economy: Why people participate in collaborative consumption. *Journal of the Association for Information Science & Technology*, 67 (9), 2047-2059.
- Han, S.S. (2020). Co-producing an urban mobility service? The role of actors, policies, and technology in the boom and bust of dockless bike-sharing programmes. *International Journal of Urban Sustainable Development*, 14 (1), 1-16.
- Han, Y. & Chen, L. (2019). Bicycle-sharing governance dilemma and its solution: based on CSG analysis framework. *Journal of Sichuan University of Science & Engineering(Social Sciences Edition)*, 34, 40-61. [In Chinese]
- Hao, Y.L. & Wen, Z.Q. (2019). Common construction, governing and sharing: intelligent management path of sharing bike by big data supporting. *Management Review*, 31, 249-254. [In Chinese]
- Hardin, G. (1968). The Tragedy of the Commons. *Science*, 162, 1243-1248.
- Hauf, A. & Douma, F. (2019). Governing Dockless Bike Share: Early Lessons for Nice Ride Minnesota. *Transportation research record*, 2673 (9), 419-429.
- He, T., Zhang, J. & Xu, H. (2019). Self-Adaptive dynamic balance of shared bicycle. *Mod, Electron. Tech*, 42, 173–178. [In Chinese]
- Heydari, S., Konstantinoudis, G. & Behsoodi, A.W. (2021). Effect of the COVID-19 pandemic on bike-sharing demand and hire time: Evidence from Santander Cycles in London. *PloS one*, 16, e0260969-e0260969.
- Heymes, C. & Levinson, D. (2019). Stationless in Sydney: The Rise and Decline of Bikesharing in Australia. *Transport Findings*.
- Hochreiter, S. & Schmidhuber, J. (1997). Long Short-Term Memory. *Neural computation*, 9 (8), 1735-1780.
- Holbrook, C. (2020). Redesigning collaborative governance for refugee settlement services. *Australian journal of political science*, 55, 86-97.

- Hong, M. (2018). Public university governance in China and Australia: a comparative study. *Higher education*, 76, 717-733.
- Hong, Q.N. & Pluye, P. (2019). A Conceptual Framework for Critical Appraisal in Systematic Mixed Studies Reviews. *Journal of mixed methods research*, 13 (4), 446-460.
- Hussey, J. & Hussey, R. (1997). *Business research : a practical guide for undergraduate and postgraduate students*. London, London: Macmillan.
- Huxham, C. (2005). *Managing to collaborate : the theory and practice of collaborative advantage* (1st ed.). London, England: Routledge
- Huxham, C. & Vangen, S. (2000). Leadership in the Shaping and Implementation of Collaboration Agendas: How Things Happen in a (Not Quite) Joined-up World. *Academy of Management journal*, 43 (6), 1159-1175.
- Huxham, C. & Vangen, S. (2004). Doing things collaboratively: realizing the advantage or succumbing to inertia? *Organizational dynamics*, 33 (2), 190.
- Janine, O.F. (2008). *Evasive appeal or aspirational ideal?: The rhetoric and reality of the 'collaborative turn' in public polic*. Canberra, Australian Capital Territory: ANU Press.
- Jia, L., Liu, X. & Liu, Y. (2018). Impact of Different Stakeholders of Bike-Sharing Industry on Users' Intention of Civilized Use of Bike-Sharing. *Sustainability*, 10 (5), 1437.
- Jiang, N. & Cai, J.M. (2017). How government play their roles in the sharing economy in the perspective of bike-sharing. *Hebei Academic Journal*, 37, 138-142. [In Chinese]
- Jiang, Q., Ou, S.-J. & Wei, W. (2019). Why Shared Bikes of Free-Floating Systems Were Parked Out of Order? A Preliminary Study based on Factor Analysis. *Sustainability*, 11 (12), 3287.
- Jie, T., Wei, W. & Jiang, L. (2020). A sustainability-oriented optimal allocation strategy of sharing bicycles: Evidence from ofo usage in Shanghai. *Resources, conservation and recycling*, 153, 104510.



- Jill, M.P. (2016). The role of power in collaborative governance. In: Margerum, R. & Robinson, C (ed.). *The Challenges of Collaboration in Environmental Governance*. Northampton, Massachusetts: Edward Elgar Publishing.
- Jin, J. & Bian, S.J. (2018). The cooperative governance route of urban shared bicycle based on stakeholder perspective: a case study of Nanjing, Jiangsu province. *Urban Development Studies*, 25, 92-99. [In Chinese]
- Jing, Y. (2015). Introduction: The Road to Collaborative Governance in China. In: Y. Jing (ed.). *The Road to Collaborative Governance in China*. New York City: Palgrave Macmillan .
- Jing, Y., Cui, Y. & Li, D. (2015). The politics of performance measurement in China. *Policy & society*, 34 (1), 49-61.
- Jing, Y. & Li, D. (2019). Private roles in enhancing Multi-Level Governance: China's "Internet + " national strategy. *Public policy and administration*, 34 (2), 144-164.
- Johnson, R. & Christensen, L. (2014). *Educational Research Quantitative, Qualitative, and Mixed Approaches* (5th ed.). London, England: SAGE Publications.
- Joinson, A. (1999). Social desirability, anonymity, and internet-based questionnaires. *Behavior research methods, instruments, & computers*, 31, 433-438.
- Klijin, E.-H. (2012). Governance network theory: past, present and future. *Policy & Politics*, 40 (4), 587-606.
- Kim, T. (2010). Collaborative Governance for Sustainable Development in Urban Planing in South Korea. Dissertation, The University of Birmingham.
- Koschmann, M.A., Kuhn, T.R. & Pfarrer, M.D. (2012). A Communicative Framework of Value in Cross-Sector Partnerships. *Academy of Management Review*, 37, 332-354.
- Lahoorpoor, B., Farooqi, H., Sadeghi-Niaraki, A. & Choi, S.-M. (2019). Spatial Cluster-Based Model for Static Rebalancing Bike Sharing Problem. *Sustainability*, 11 (11), 3205.

- Lan, J., Ma, Y., Zhu, D., Mangalagiu, D. & Thornton, F.T. (2017). Enabling Value Co-Creation in the Sharing Economy: The Case of Mobike. *Sustainability*, 9 (9), 1504.
- Lan, L. (2019). Research on bike-sharing behavior from the perspective of communication ecology. *Minzu University of China*, 22, 1-14. [In Chinese]
- Leng, X.M. & Guo, S.Y. (2018). Government responsibilities in the governance of the sharing economy: taking shared bicycles for example. *Comparative Economic & Social Systems*, 33, 88-94. [In Chinese]
- Li, Y. & Han, C.P. (2018). Discussion on evolution of shared bikes governance. *Science & Technology for Development*, 14, 1166-1174. [In Chinese]
- Li, Z., Shang, Y., Zhao, G. & Yang, M. (2022). Exploring the Multiscale Relationship between the Built Environment and the Metro-Oriented Dockless Bike-Sharing Usage. *International journal of environmental research and public health*, 19 (4), 2323.
- Lincoln, Y.S. & Denzin, N.K. (1998). *The landscape of qualitative research : theories and issue*. Thousand Oaks, California: Sage Publications.
- Linder, S.H. (1999). Coming to Terms With the Public-Private Partnership: A Grammar of Multiple Meanings. *The American behavioral scientist (Beverly Hills)*, 43 (1), 35-51.
- Liu, Ma, Zhu & Ji (2019). An Investigation on Responsible Innovation in the Emerging Shared Bicycle Industry: Case Study of a Chinese Firm. *Journal of open innovation*, 5, 42.
- Liu, R. & Zhang, X.X. (2018). The governance of negative externality of Shared bikes in urban public space: interpretation, dilemma and regulation path. *Tribune of Study*, 34, 71-76. [In Chinese]
- Liu, T., Wang, Y. & Wilkinson, S. (2016). Identifying critical factors affecting the effectiveness and efficiency of tendering processes in Public–Private Partnerships (PPPs): A comparative analysis of Australia and China. *International journal of project management*, 34 (4), 701-716.
- Liu, X. & Pan, L. (2019). A Genetic Algorithm for Solving Bike-sharing Rebalancing

- Problem. *Computer Engineering*, 45, 308-313. [In Chinese]
- Liu, Z. (2020). Collaborative governance for responsible innovation in the context of sharing economy: studies on the shared bicycle sector in China. *Journal of open innovation*, 6 (2), 1-14.
- Liu, G.R. (2017). Shared Economy: The Subversion of the Traditional Economic Model. *Economist* 29, 97–104.
- Lune, H. & Berg, B.L., 2017. *Qualitative research methods for the social sciences*, Ninth edition, Global edition. ed. Harlow, England: Pearson.
- Ma, Y., Lan, J., Thornton, T., Mangalagu, D. & Zhu, D.J. (2018). Challenges of collaborative governance in the sharing economy: The case of free-floating bike sharing in Shanghai. *Journal of Cleaner Production*, 197, 356-365.
- Mahmoodian, V., Zhang, Y. & Charkhgard, H. (2022). Hybrid rebalancing with dynamic hubbing for free-floating bike sharing systems. *International Journal of Transportation Science and Technology*, 11, 636-652.
- Mason, M. (2010). Sample size and saturation in PhD studies using qualitative interviews. *Forum, qualitative social research*, 11 (3), 1428.
- Mateo-Babiano, I., Kumar, S. & Mejia, A. (2017). Bicycle sharing in Asia: a stakeholder perception and possible futures. *Transportation Research Procedia*, 25, 4966-4978.
- Mehmet, S. (2020). *Shared E-Bike Services Trial Memorandum of Understanding*. City of Melbourne. Available via DIALOG. [www.melbourne.vic.gov.au](http://www.melbourne.vic.gov.au) of subordinate document. Accessed 15 Jan 2020.
- Merriam, S.B. & Grenier, R.S. (2019). *Qualitative research in practice : examples for discussion and analysis* (2nd ed.). San Francisco, California: Jossey-Bass.
- Mikwamba, K., Dessein, J., Kambewa, D., Messely, L. & Strong, R. (2020). Collaborative governance dynamics in innovation platforms: case of Malawi's District Stakeholder Panel. *The journal of agricultural education and extension*, 27 (2), 1-21.
- Mobike. (2017). *Mobike*. [https:// www.mobike.com](https://www.mobike.com). Accessed 1 Jan 2023.

- Mont, O., Plepys, A., Voytenko Palgan, Y., Lehner, M., Curtis, S., Zvolaska, L., Arbelaez Velez, A. M. (2020). Urban sharing in Shanghai. Lund: IIIIEE at Lund University, 64.
- Mody, M.A., Hanks, L. & Cheng, M. (2021). Sharing economy research in hospitality and tourism: a critical review using bibliometric analysis, content analysis and a quantitative systematic literature review. *International journal of contemporary hospitality management*, 33 (5), 1711-1745.
- Montinola, G., Qian, Y. & Weingast, B.R. (1995). Federalism, Chinese Style: The Political Basis for Economic Success in China. *World politics*, 48 (1), 50-81.
- Montoya-Weiss, M.M. & Calantone, R. (1994). Determinants of new product performance: A review and meta-analysis. *The Journal of product innovation management*, 11 (5), 397-417.
- Naga, V.K.J. & Kodali, R. (2014). A literature review of empirical research methodology in lean manufacturing. *International journal of operations & production management*, 34 (8), 1080-1122.
- Newman, J., Barnes, M., Sullivan, H. & Knops, A. (2004). Public Participation and Collaborative Governance. *Journal of social policy*, 33 (2), 203-223.
- Nguyen Thi Hoai, T., Le Trung, T., Chu Thi Phuong, D., Nguyen, L.-T. & Ha Vu, L. (2017). Multi-source data analysis for bike sharing systems. 2017 *International Conference on Advanced Technologies for Communications (ATC)*, Quy Nhon city, Vietnam, 235-240.
- Nie, Y. & Zhang, K. (2018). Cost optimization management strategy of sharing bike industry under sharing economy. 35, 8-11. [In Chinese]
- NLC. (2011). Integrating Bike Share Programs into a Sustainable Transportation System. Available via [www.scribd.com](http://www.scribd.com) of subordinate document. Accessed 11 Feb 2017.
- O'flynn, J. & Wanna, J. (2008). *Collaborative governance : a new era of public policy in Australia?* Canberra, Australian Capital Territory: ANU Press.

- Parkes, S.D., Marsden, G., Shaheen, S.A. & Cohen, A.P. (2013). Understanding the diffusion of public bikesharing systems: evidence from Europe and North America. *Journal of Transport Geography*, 31, 94-103.
- Peng, H.T., Luo, Y.L. & Xia, D. (2018). Unusual imitation behavior and cooperative governance of sharing economy and entrepreneurship. *Studies in Science of Science*, 36, 1235-1243. [In Chinese]
- Pham, T.H., Steven, W. & Kerry, T. (2016). Collaboration between academics and library staff: a comparative study of two universities in Australia and Vietnam. Dissertation, Monash University.
- Pieterse, E.A. (2000). *Participatory Urban Governance: Practical Approaches, Regional Trends, and UMP Experiences*. UMP discussion paper, Published for the Urban Management Programme by UNCHS (Habitat).
- Provan, K.G. & Milward, H.B. (1995). A Preliminary Theory of Interorganizational Network Effectiveness: A Comparative Study of Four Community Mental Health Systems. *Administrative science quarterly*, 40 (1), 1-33.
- Purdy, J.M. (2012). A Framework for Assessing Power in Collaborative Governance Processes. *Public administration review*, 72 (3), 409-417.
- Qiao, M. (2016). Economic Linkages of China's Small Towns: Urban-Rural Integration in a Learning Economy. Dissertation, The University of Manchester.
- Qin, Z. & Wang, Q. (2017). Synergy mechanism in the vision of sharing economy: taking shared bikes for example. *Reform*, 30, 124-134. [In Chinese]
- Qiu, L.-Y. & He, L.-Y. (2018). Bike Sharing and the Economy, the Environment, and Health-Related Externalities. *Sustainability*, 10 (4), 1145.
- Ragin, C.C. & Rihoux, B. (2009). *Configurational comparative methods qualitative comparative analysis (QCA) and related techniques*. Thousand Oaks, California: Sage Publications.
- Ran, B. & Qi, H. (2018). Contingencies of Power Sharing in Collaborative Governance. *American review of public administration*, 48 (8), 836-851.

- Ran, B. & Qi, H. (2019). The Entangled Twins: Power and Trust in Collaborative Governance. *Administration & society*, 51 (4), 607-636.
- Ricci, M. (2015). Bike sharing: A review of evidence on impacts and processes of implementation and operation. *Research in Transportation Business & Management*, 15, 28-38.
- Rindfleisch, A., Malter, A.J., Ganesan, S. & Moorman, C. (2008). Cross-Sectional versus Longitudinal Survey Research: Concepts, Findings, and Guidelines. *Journal of marketing research*, 45 (3), 261-279.
- Ring, P.S. & Van De Ven, A.H. (1994). Developmental processes of cooperative interorganizational relationships. *The Academy of Management Review*, 19, 90-118.
- Rojanakit, P., Torres De Oliveira, R. & Dulleck, U. (2022). The sharing economy: A critical review and research agenda. *Journal of business research*, 139, 1317-1334.
- Ryu, H., Basu, M. & Saito, O. (2019). What and how are we sharing? A systematic review of the sharing paradigm and practices. *Sustainability science*, 14 (4), 515-527.
- Saich, T. (2000). Negotiating the State: The Development of Social Organizations in China. *The China quarterly (London)*, 161, 124-141.
- Schlæger, J. (2015). Collaboration in China's E-Government: A Cultural-Theory Analysis. In: Y. Jing (ed.). *The Road to Collaborative Governance in China*. New York City: Palgrave Macmillan .
- Seidman, I. (2019). *Interviewing as qualitative research : a guide for researchers in education and the social sciences* (5th ed.). New York City: Teachers College Press.
- Selin, S. & Chevez, D. (1995). Developing a collaborative model for environmental planning and management. *Environmental management*, 19, 189-195.
- Shaheen, S.A., Guzman, S. & Zhang, H. (2010). Bikesharing in Europe, the Americas, and Asia: Past, Present, and Future. *Transportation Research Record*, 2143, 159-167.

- Shi, J.G., Si, H.Y., Wu, G.D., Su, Y.Y. & Lan, J. (2018). Critical Factors to Achieve Dockless Bike-Sharing Sustainability in China: A Stakeholder-Oriented Network Perspective. *Sustainability*, 10 (6), 2090.
- Si, H., Shi, J.-G., Wu, G., Chen, J. & Zhao, X. (2019). Mapping the bike sharing research published from 2010 to 2018: A scientometric review. *Journal of Cleaner Production*, 213, 415-427.
- Song, S.N. (2017). Research on the legal supervision of shared bicycle. *Henan Social Sciences*, 25, 67-70. [In Chinese]
- Soni, G. & Kodali, R. (2012). A critical review of empirical research methodology in supply chain management. *Journal of manufacturing technology management*, 23 (6), 753-779.
- Sun, Y.Y. (2018). Sharing and Riding: How the Dockless Bike Sharing Scheme in China Shapes the City. *Urban Science*, 2 (3), 68-68.
- Swyngedouw, E. (2005). Governance Innovation and the Citizen: The Janus Face of Governance-beyond-the-State. *Urban studies*, 42, 1991-2006.
- Swiss Federal Office for Energy (SFOE). (2006). Evaluation Car-Sharing. Available via [www.bfe.admin.ch](http://www.bfe.admin.ch) of subordinate document. Accessed 11 Jan 2017.
- Tremblay-Huet, S., Scassa, T., Makela, F. & Mckee, D. (2018). *Law and the "Sharing Economy" Regulating Online Market Platforms*. Ontario, Ottawa : University of Ottawa Press.
- Vallez, C.M., Castro, M. & Contreras, D. (2021). Challenges and Opportunities in Dock-Based Bike-Sharing Rebalancing: A Systematic Review. *Sustainability*, 13 (4), 1829.
- Van Eijk, C. & Gascó, M. (2018). Unravelling the Co-Producers: Who are They and What Motivations do They Have?. In: VE. Carola (ed.). Oxfordshire, England: Routledge .
- Van Waes, A., Farla, J. & Raven, R. (2020). Why do companies' institutional strategies differ across cities? A cross-case analysis of bike sharing in Shanghai & Amsterdam. *Environmental innovation and societal transitions*, 36, 151-163.

- Vith, S., Oberg, A., Höllerer, M.A. & Meyer, R.E. (2019). Envisioning the 'Sharing City': Governance Strategies for the Sharing Economy. *Journal of Business Ethics*, 159, 1023-1046.
- Wang, F. & Yin, H. (2012). A New Form of Governance or the Reunion of the Government and Business Sector? A Case Analysis of the Collaborative Natural Disaster Insurance System in the Zhejiang Province of China. *International public management journal*, 15 (4), 429-453.
- Wang, H., Chen, B., Xiong, W., Yang, L. & Zhu, D. (2019). Multiple Pathways to Public-Private Partnerships for Urban Public Service Delivery: A Cross-City Comparison of Bicycle-Sharing Service in China. *Urban Policy and Research*, 37 (4), 1-15.
- Wang, H., Cheng, Z. & Zhu, D. (2020). Striving for global cities with governance approach in transitional China: Case study of Shanghai. *Land use policy*, 90 (9), 104288.
- Wang, H., Xiong, W., Yang, L., Zhu, D. & Cheng, Z. (2020). How does public-private collaboration reinvent? A comparative analysis of urban bicycle-sharing policy diffusion in China. *Cities*, 96 (4), 102429.
- Wang, J., Huang, J. & Dunford, M. (2019). Rethinking the Utility of Public Bicycles: The Development and Challenges of Station-Less Bike Sharing in China. *Sustainability*, 11 (6), 1539-1539.
- Wang, Q. (2017). Research on the challenges and countermeasures of the development of sharing economy: from the perspective of Shared bicycles. *Review of Economic Research*, 39, 37-41. [In Chinese]
- Wang, X.L. (2018). Social morality governance: origin, operation and realization: taking the use of Shared bikes as an example. *Morality and Civilization*, 37, 130-136. [In Chinese]
- Wang, Y. & Chen, X. (2020). River chief system as a collaborative water governance approach in China. *International journal of water resources development*, 36 (4), 610-630.



- Wang, Z.Y. & He, D.G. (2017). Common problems and governance paths of sharing bicycle development: based on the perspective of product theory. *Price:Theory & Practice*, 37, 140-143. [In Chinese]
- Wei, S. (2022). The Collaborative Governance Between Public and Private Companies to Address Climate Issues to Foster Environmental Performance: Do Environmental Innovation Resistance and Environmental Law Matter? *Frontiers in psychology*, 13.
- Weng, S.H. (2018). Research on the holistic governance innovation of urban bike-sharing regulatory system. *E-Government*, 15, 21-31. [In Chinese]
- Wu, F. & Zhang, F. (2022). Rethinking China's urban governance: The role of the state in neighbourhoods, cities and regions. *Progress in human geography*, 46 (3), 775-797.
- Wu, R., Liu, S. & Shi, Z. (2019). Customer Incentive Rebalancing Plan in Free-Float Bike-Sharing System with Limited Information. *Sustainability*, 11 (11), 3088.
- Xian, H. & Meng-Lewis, Y. (2018). *Business Research Methods for Chinese students: A practical guide to your research project*. Thousand Oaks, California: Sage Publications.
- Xie, X.S. (2018). The theoretical reason of "failure of cooperation" in collaborative governance: from the perspective of "otherness". *Academics*, 33, 76-90. [In Chinese]
- Xu, C., Ji, J. & Liu, P. (2018). The station-free sharing bike demand forecasting with a deep learning approach and large-scale datasets. *Transportation Research Part C Emerging Technologies*, 95, 47-60.
- Xu, J., Ma, Y. & Fan, L. (2018). Involved consumers: taking Mokike hunter as an example. *China Youth Study*, 29, 11-18. [In Chinese]
- Yang, L. (2017). Types and Institutional Design Principles of Collaborative Governance in a Strong-Government Society: The Case Study of Desertification Control in Northern China. *International public management journal*, 20, 586-623.

- Yang, L.H. & Zhu, D.J. (2019). The logic of Governing the bicycle-sharing service-strategies based on attributes of urban public space. *Urban Development Studies*, 26. [In Chinese]
- Yao, Y., Liu, L.W., Guo, Z.B., Liu, Z.H. & Zhou, H.Y. (2019). Experimental Study on Shared Bike Use Behavior under Bounded Rational Theory and Credit Supervision Mechanism. *Sustainability*, 11 (1), 127.
- Yeung, H.W.-C. (2009). Regional Development and the Competitive Dynamics of Global Production Networks: An East Asian Perspective. *Regional studies*, 43, 325-351.
- Yi, P., Huang, F. & Peng, J. (2019). A Rebalancing Strategy for the Imbalance Problem in Bike-Sharing Systems. *Energies*, 12 (13), 2578.
- Yin, J., Qian, L. & Shen, J. (2019). From value co-creation to value co-destruction? The case of dockless bike sharing in China. *Transportation Research Part D Transport and Environment*, 71, 169-185.
- Yin, R.K. (1994). *Case study research : design and methods* (2nd ed.). Thousand Oaks, California: Sage Publications.
- Yin, R.K. (2014). *Case study research : design and methods* (5th ed.). Thousand Oaks, California: Sage Publications.
- Yue, Y.J. & Hu, H.H. (2019). The research on the governance countermeasure of shared bicycle based on multi-theoretical perspective. *Journal of Technical Economics & Management*, 40, 86-91. [In Chinese]
- Zhai, Y., Du, J. & Wu, H. (2019). Fleet Size and Rebalancing Analysis of Dockless Bike-Sharing Stations Based on Markov Chain. *ISPRS international journal of geo-information*, 8, 334.
- Zhang, X., Shen, Y. & Zhao, J. (2021). The mobility pattern of dockless bike sharing: A four-month study in Singapore. *Transportation research. Part D, Transport and environment*, 98, 102961.
- Zhang, Y.P., Lin, D. & Mi, Z.F. (2019). Electric fence planning for dockless bike-sharing services. *Journal of Cleaner Production*, 206, 383-393.

- Zhao, D. & Wang, D. (2019). The Research of Tripartite Collaborative Governance on Disorderly Parking of Shared Bicycles Based on the Theory of Planned Behavior and Motivation Theories—A Case of Beijing, China. *Sustainability*, 11 (19), 5431.
- Zheng, J.H. & Li, G. (2018). The government responsibility and tools innovation for the effective governance of the negative externalities of quasi-public goods: taking the shared bicycle as an example. *Journal of Tianjin Administration Institute*, 20, 3-10.
- Zheng, W.W. & Chen, J.P. (2018). Cooperative network governance: selection of governance mode and optimization countermeasures for bike-sharing. *E-Government*, 15, 61-67. [In Chinese]
- Zhou, J., Guo, Y., Sun, J., Yu, E. & Wang, R. (2022). Review of bike-sharing system studies using bibliometrics method. *Journal of Traffic and Transportation Engineering*, 9 (3), 608-630.

# Appendices

Appendix A Thematic coding of selected papers of Chapter 2

No	Year published and authors	Key topics examined in paper	Themes addressed in each paper				Disciplinary focus of paper
			Theme 1: The inherent characteristics of the sharing economy and its externalities underpinning the governance of DBSS	Theme 2: Rebalancing problem of DBSS	Theme 3: The government regulation of DBSS	Theme 4: The cross-boundary collaboration in the governance of DBSS	
1	Lan et al. (2017)	Enabling factors of value co-creation in DBSS	✓			✓	Business economics; public management science; environmental science
2	Pal and Zhang (2017)	Static rebalancing problems of DBSS		✓			Transport research
3	Zhu and She (2017)	Discussion on the definition of “sharing economy”	✓				Public management science
4	Jiang and Cai (2017)	Role that government plays in the regulation of DBSS	✓		✓		Business economics; public management science

No	Year published and authors	Key topics examined in paper	Themes addressed in each paper				Disciplinary focus of paper
			Theme 1: The inherent characteristics of the sharing economy and its externalities underpinning the governance of DBSS	Theme 2: Rebalancing problem of DBSS	Theme 3: The government regulation of DBSS	Theme 4: The cross-boundary collaboration in the governance of DBSS	
5	Zhang et al. (2017)	Economic characteristics and existing problems of the DBSS	✓				Business economics
6	D. Z. Wang (2017)	Legal regulation for misbehaviours in the DBSS			✓		Science of law
7	Q. Wang (2017)	Challenges that sharing economy faces in the development of DBSS and the solutions	✓		✓		Business economics
8	Deng and Li (2017)	Characteristics of cash pledge in DBSS and its regulatory rule			✓		Public management science
9	X. W. Song (2017)	Logic of consultation governance in DBSS			✓	✓	Political science; public management science
10	Wang and He (2017)	Existing problems of DBSS and the solutions from the perspective of “public goods” theory	✓				Business economics
11	S. N. Song (2017)	System of legal regulation operating in DBSS			✓		Science of law

No	Year published and authors	Key topics examined in paper	Themes addressed in each paper				Disciplinary focus of paper
			Theme 1: The inherent characteristics of the sharing economy and its externalities underpinning the governance of DBSS	Theme 2: Rebalancing problem of DBSS	Theme 3: The government regulation of DBSS	Theme 4: The cross-boundary collaboration in the governance of DBSS	
12	Peng and Wang (2017)	Government and governance in DBSS and solutions			✓		Public management science
13	Tan (2017)	The “race to the bottom” in DBSS and solutions	✓				Science of law
14	Guo et al. (2017)	Mechanisms of collaborative governance in DBSS	✓		✓	✓	Public management science
15	Qin and Wang (2017)	Collaborative mechanism in the governance of DBSS	✓		✓		Business economics; public management science
16	Xu (2018)	Shared participation and social publicity in governance of DBSS	✓				Sociology; public administration
17	Caggiani et al. (2018)	Dynamic rebalancing framework in DBSS		✓			Transport research
18	Liu et al, (2018)	Static rebalancing framework in DBSS		✓			Transport research
19	Lu et al. (2018)	How DBSS changes user travel behaviours and minimize the environmental and social	✓				Energy fuels

No	Year published and authors	Key topics examined in paper	Themes addressed in each paper				Disciplinary focus of paper
			Theme 1: The inherent characteristics of the sharing economy and its externalities underpinning the governance of DBSS	Theme 2: Rebalancing problem of DBSS	Theme 3: The government regulation of DBSS	Theme 4: The cross-boundary collaboration in the governance of DBSS	
		impacts of an integrated transport system					
20	Sun (2018)	The development and governance of DBSS				✓	Public management science
21	Xu et al. (2018)	Bicycle demand forecasting		✓			Transport research
22	Nie and Zhang (2018)	Cost optimization and management strategy of DBSS		✓			Business economics
23	Hao et al. (2018)	Selection of parking station of DBSS based on minimum vertex cover problem		✓			Transport research
24	Fan (2018)	Local legislation in the field of DBSS through case study of 9 Chinese cities			✓		Science of law
25	Chen and Wang (2018)	Legislative model of local legislation in the regulation of DBSS			✓		Science of law

No	Year published and authors	Key topics examined in paper	Themes addressed in each paper				Disciplinary focus of paper
			Theme 1: The inherent characteristics of the sharing economy and its externalities underpinning the governance of DBSS	Theme 2: Rebalancing problem of DBSS	Theme 3: The government regulation of DBSS	Theme 4: The cross-boundary collaboration in the governance of DBSS	
26	Jin and Bian (2018)	Collaborative governance of DBSS through case study of the perspective of stakeholders				✓	Business economics; science of law; public management science
27	Xu et al. (2018)	Participation of users and volunteers in the governance process of DBSS				✓	Sociology
28	Yang and Zhu (2018)	Factors that influence parking behaviours in DBSS				✓	Public management science
29	Li et al. (2018)	Vandalism in DBSS and solutions			✓		Business economics; public management science
30	Xie (2018)	Reasons of unsuccessful collaboration in the collaborative governance of DBSS				✓	Public management science
31	Gao and Li (2018)	Collaborative governance of DBSS through SFIC model				✓	Public management science



No	Year published and authors	Key topics examined in paper	Themes addressed in each paper				Disciplinary focus of paper
			Theme 1: The inherent characteristics of the sharing economy and its externalities underpinning the governance of DBSS	Theme 2: Rebalancing problem of DBSS	Theme 3: The government regulation of DBSS	Theme 4: The cross-boundary collaboration in the governance of DBSS	
32	Peng et al. (2018)	Imitation behaviour in DBSS and collaborative governance of DBSS				✓	Public management science
33	Liu and Zhang (2018)	Negative externalities of DBSS and regulatory approaches	✓		✓	✓	Public management science
34	Zheng and Li (2018)	Negative externalities of DBSS, and the government responsibilities and innovation in DBSS	✓		✓		Political science; public management science
35	Sun and Yuan (2018)	Government regulation of DBSS and DBSS as part of the sharing economy			✓		Science of law
36	X. L. Wang (2018)	Social and moral governance in DBSS				✓	Ideology and politics
37	Weng (2018)	Holistic governance in DBSS			✓	✓	Public management science
38	Hao (2018)	Governance innovation in the sharing economy	✓				Business economics
39	Zheng and Chen (2018)	Innovation and optimization of	✓			✓	Public management science

No	Year published and authors	Key topics examined in paper	Themes addressed in each paper				Disciplinary focus of paper
			Theme 1: The inherent characteristics of the sharing economy and its externalities underpinning the governance of DBSS	Theme 2: Rebalancing problem of DBSS	Theme 3: The government regulation of DBSS	Theme 4: The cross-boundary collaboration in the governance of DBSS	
		governance in DBSS through the collaborative network perspective					
40	Li and Han (2018)	Evolution of governance in DBSS and big data governance in DBSS			✓	✓	Public management science
41	Gan and Lou (2018)	Characteristics of DBSS, collaboration between government and private sectors in the development and governance of DBSS	✓				Public management science
42	Leng and Guo (2018)	Government responsibilities in the governance of DBSS	✓		✓		Public management science
43	Cheng and Qi (2018)	Government regulation in DBSS through local policy documents of 15 Chinese cities			✓		Public management science
44	Ma et al. (2018)	Challenges of collaborative governance in DBSS				✓	Public management science; environmental science

No	Year published and authors	Key topics examined in paper	Themes addressed in each paper				Disciplinary focus of paper
			Theme 1: The inherent characteristics of the sharing economy and its externalities underpinning the governance of DBSS	Theme 2: Rebalancing problem of DBSS	Theme 3: The government regulation of DBSS	Theme 4: The cross-boundary collaboration in the governance of DBSS	
45	Shi et al. (2018)	Stakeholder networks in governance of DBSS	✓			✓	Environmental science; public management science
46	Jia, Liu and Liu (2018)	Factors that affect the use of civilization in DBSS from the perspective of stakeholders				✓	Public management science; environmental science; business economics
47	Du and Cheng (2018)	Characteristics and influential factors of travel patterns in DBSS	✓				Transport research
48	Gao et al. (2018)	Spatiotemporal distribution forecasting of DBSS and rebalancing strategy		✓			Transport research
49	Qiu and He (2018)	DBSS and its externalities	✓				Green sustainable science technology; environmental science
50	Chen et al., (2018)	DBSS's attributes	✓				Business economics
51	Yao et al. (2019)	User behaviour, externalities and credit	✓				Public management science; environmental

No	Year published and authors	Key topics examined in paper	Themes addressed in each paper				Disciplinary focus of paper
			Theme 1: The inherent characteristics of the sharing economy and its externalities underpinning the governance of DBSS	Theme 2: Rebalancing problem of DBSS	Theme 3: The government regulation of DBSS	Theme 4: The cross-boundary collaboration in the governance of DBSS	
		supervision mechanism of DBSS					science; business economics
52	Ai et al. (2019)	Short-term spatiotemporal distribution forecasting of DBSS		✓			Transport research
53	Ban and Hyun (2019)	User participation-based rebalancing approach of DBSS		✓			Transport research
54	Du et al. (2019)	The spatiotemporal usage patterns of DBSS		✓			Transport research
55	Gu (2019)	Optimization algorithm of usage efficiency of DBSS		✓			Transport research
56	Lahoorpoor et al. (2019)	Static rebalancing problem of DBSS		✓			Transport research
57	Zhai et al. (2019)	Forecasting of fleet size and rebalancing of DBSS		✓			Transport research
58	Tian et al. (2019)	Users' demand fluctuation in DBSS		✓			Transport research
59	Wu et al. (2019)	User participation-based rebalancing approach of DBSS		✓			Transport research

No	Year published and authors	Key topics examined in paper	Themes addressed in each paper				Disciplinary focus of paper
			Theme 1: The inherent characteristics of the sharing economy and its externalities underpinning the governance of DBSS	Theme 2: Rebalancing problem of DBSS	Theme 3: The government regulation of DBSS	Theme 4: The cross-boundary collaboration in the governance of DBSS	
60	Zhang and Meng (2019)	Rebalancing strategy of DBSS		✓			Transport research
61	Yu et al. (2019)	Model and algorithm of DBSS rebalance		✓			Transport research
62	Zhang et al. (2019)	Electric fence planning of DBSS		✓			Transport research
63	Zhao et al. (2019)	Influence of built environment for DBSS rebalance		✓			Transport research
64	He et al. (2019)	Static and dynamic rebalancing strategy of DBSS		✓			Transport research
65	Guan and Lu (2019)	User participation-based rebalancing approach of DBSS		✓			Transport research
66	Liu and Pan (2019)	Genetic algorithm for solving DBSS rebalancing problem		✓			Transport research
67	Xu et al. (2019)	Rebalancing strategy for broken shared bicycles		✓			Transport research

No	Year published and authors	Key topics examined in paper	Themes addressed in each paper				Disciplinary focus of paper
			Theme 1: The inherent characteristics of the sharing economy and its externalities underpinning the governance of DBSS	Theme 2: Rebalancing problem of DBSS	Theme 3: The government regulation of DBSS	Theme 4: The cross-boundary collaboration in the governance of DBSS	
68	Jiang et al. (2019)	Factors influencing disorderly parking issues in DBSS	✓				Urban design
69	Wang et al. (2019)	Discrete differential evolution algorithm for DBSS rebalancing problem		✓			Transport research
70	Wang et al. (2019)	Development and challenges of DBSS in China	✓		✓		Environmental science; green sustainable science technology
71	Hao and Wen (2019)	Intelligent governance in DBSS				✓	Public management science
72	Fang and Yang (2019)	Legal regulation of DBSS through the multiple stream's framework	✓		✓		Public management science
73	Pan et al. (2019)	Capacity range length insertion heuristic algorithm for DBSS rebalancing problem		✓			Transport research
74	Yue and Hu (2019)	Collaborative governance of DBSS through the	✓		✓	✓	Public management science

No	Year published and authors	Key topics examined in paper	Themes addressed in each paper				Disciplinary focus of paper
			Theme 1: The inherent characteristics of the sharing economy and its externalities underpinning the governance of DBSS	Theme 2: Rebalancing problem of DBSS	Theme 3: The government regulation of DBSS	Theme 4: The cross-boundary collaboration in the governance of DBSS	
		perspective of multiple theories					
75	Xie et al. (2019)	Dynamic rebalancing strategy of DBSS		✓			Transport research
76	Yang et al. (2019)	Public participation and feedback in the process of decision-making in the governance of DBSS			✓		Public management science
77	Gu and Zhang (2019)	Governance of DBSS through the perspective of co-production				✓	Public management science
78	Gu et al. (2019)	Development and challenges of DBSS	✓		✓		Business economics; transport research
79	Ma et al. (2019)	Value co-creation in DBSS	✓			✓	Environmental science; green sustainable science technology
80	Han and Chen (2019)	The dilemma of regulation in DBSS and collaborative governance through the CSG framework	✓			✓	Public management science

No	Year published and authors	Key topics examined in paper	Themes addressed in each paper				Disciplinary focus of paper
			Theme 1: The inherent characteristics of the sharing economy and its externalities underpinning the governance of DBSS	Theme 2: Rebalancing problem of DBSS	Theme 3: The government regulation of DBSS	Theme 4: The cross-boundary collaboration in the governance of DBSS	
81	Zhang and Hua (2019)	Regulation of DBSS	✓				Public management science
82	Yang and Zhu (2019)	Collaborative governance of DBSS with a focus on urban public space				✓	Public management science
83	Yin et al. (2019)	Value co-creation and value co-destruction of DBSS				✓	Environmental science; transport research
84	Yan and Liu (2019)	Dynamic rebalancing strategy of DBSS		✓			Transport research
85	Jie et al. (2020) – available online 06 November 2019	Data-driven approach for DBSS rebalancing		✓			Transport research
86	Liu et al. (2019)	Responsible Innovation in the DBSS	✓		✓	✓	Public management science; business economics
87	Cheng et al. (2019)	Collaborative geofence sites				✓	Computer science and information system; engineering electrical electronic; telecommunications



No	Year published and authors	Key topics examined in paper	Themes addressed in each paper				Disciplinary focus of paper
			Theme 1: The inherent characteristics of the sharing economy and its externalities underpinning the governance of DBSS	Theme 2: Rebalancing problem of DBSS	Theme 3: The government regulation of DBSS	Theme 4: The cross-boundary collaboration in the governance of DBSS	
88	Wang and Ahsan (2019)	Risk and risk management strategies in DBSS management			✓	✓	Public management science; business economics
89	Chen (2019)	The obligations of the DBSS companies			✓	✓	Law
90	Hauf and Douma (2019)	The government governance of DBSS			✓		Engineering civil; transport research
91	Hirsch et al. (2019)	The development and government governance of DBSS in North America			✓	✓	Transport research
92	An et al. (2019)	Collaborative governance in the DBSS				✓	Art
93	Sun et al. (2019)	Credit-based supervision policies in DBSS			✓	✓	Public management science; business economics
94	Zhao and Wang (2019)	Collaborative governance on disorderly parking			✓	✓	Public management science; business economics
95	Wang et al. (2019)	Public-private partnerships in DBSS			✓	✓	Public management science

**Appendix B** Overview of selected papers in the methodological review of Chapter 3

Reference	Purpose	Methodology	Research design	Method							Theoretical framework	
				Data collection	Implementation				Data analysis			
					Sample size	Time horizon	Type of respondent	Geographical distribution				
								Region		Level of region		
1	Guo et al. (2017)	Theory building	MIX	Single case study; survey	<ul style="list-style-type: none"> <li>• Questionnaire survey (Online)</li> <li>• Interview</li> </ul>	<ul style="list-style-type: none"> <li>• Online survey (n=615, RR: 87.86%)</li> <li>• Interview (not mentioned)</li> </ul>	Cross-sectional data	Government official; company staff; user	China	Country	<ul style="list-style-type: none"> <li>• Descriptive statistics (frequencies and proportions)</li> </ul>	Collaborative governance framework for demand-driven service
2	Lan et al. (2017)	Theory building (both)	MIX	Single case study; survey	<ul style="list-style-type: none"> <li>• Questionnaire survey (Online)</li> <li>• Interview</li> <li>• Non-participatory observation</li> </ul>	<ul style="list-style-type: none"> <li>• Online survey (n=457, RR: 68%)</li> <li>• Interview (n=21)</li> </ul>	Cross-sectional data	Users	China	City	<ul style="list-style-type: none"> <li>• Descriptive statistics (frequencies and proportions)</li> <li>• Measures of dimensionalities (logit regression)</li> </ul>	N/A
3	Ma et al. (2018)	Theory verification	QUAL	Single case study; focus group	<ul style="list-style-type: none"> <li>• Documentation</li> <li>• Multiple stakeholder meetings</li> <li>• Interview</li> <li>• Participatory and non-participatory observation</li> <li>• Interview</li> </ul>	<ul style="list-style-type: none"> <li>• Interview (n=70)</li> </ul>	Cross-sectional data	Government official; company staff; volunteer; scholar	China	City	Not explicitly defined	Integrative analytical framework for collaborative governance
4	Shi et al. (2018)	Theory building	QUAL	Single case study	<ul style="list-style-type: none"> <li>• Interview</li> </ul>	<ul style="list-style-type: none"> <li>• Interview (n=30)</li> </ul>	Cross-sectional data	Government official; company staff;	China	Country	Social network analysis	N/A

Reference	Purpose	Methodology	Research design	Method							Theoretical framework	
				Data collection	Implementation			Data analysis				
					Sample size	Time horizon	Type of respondent		Geographical distribution			
									Region	Level of region		
5	Ma et al. (2018)	Theory building	QUAL	Multiple case studies; focus group	<ul style="list-style-type: none"> <li>Documentation</li> <li>Questionnaire survey</li> <li>Multiple stakeholder meetings</li> <li>Interview</li> <li>Participatory observation</li> </ul>	<ul style="list-style-type: none"> <li>Interview (n=30)</li> </ul>	Cross-sectional data	<ul style="list-style-type: none"> <li>user; citizen; manufacture</li> <li>Government official; company staff; scholar</li> </ul>	China	City	Not explicitly defined	T2S framework; BEI framework
6	Jia et al. (2018)	Theory verification	QUAN	Single case study; survey	<ul style="list-style-type: none"> <li>Questionnaire survey (online)</li> </ul>	<ul style="list-style-type: none"> <li>Online questionnaire survey (n=250, RR: 83 %, pilot test with 30 volunteers)</li> </ul>	Cross-sectional data	User	China	City	<ul style="list-style-type: none"> <li>Descriptive statistics (frequencies and proportions)</li> <li>Measures of dimensionalities (correlation analysis, regression analysis)</li> </ul>	Stimulus-Organism-Response framework
7	Zhang and Gu (2018)	Theory building	QUAL	Single case study	<ul style="list-style-type: none"> <li>Interview</li> </ul>	<ul style="list-style-type: none"> <li>Interviews (n=11)</li> </ul>	Cross-sectional data	<ul style="list-style-type: none"> <li>Government official; company staff</li> </ul>	China	City	Not explicitly defined	N/A
8	Jin and Bian (2018)	Theory building	QUAN	Single case study; survey	<ul style="list-style-type: none"> <li>Documentation</li> <li>Questionnaire survey</li> <li>Interview</li> </ul>	<ul style="list-style-type: none"> <li>Questionnaire survey (n=183, RR: 91.5%)</li> <li>Interview (not mentioned)</li> </ul>	Cross-sectional data	User	China	City	<ul style="list-style-type: none"> <li>Descriptive statistics (frequencies and proportions)</li> </ul>	N/A

Reference	Purpose	Methodology	Research design	Method							Theoretical framework	
				Data collection	Implementation			Data analysis				
					Sample size	Time horizon	Type of respondent		Geographical distribution			
									Region	Level of region		
9	Yang and Zhu (2018)	Both	QUAN	Single case study; survey	<ul style="list-style-type: none"> <li>Questionnaire survey (online, pen-and-paper)</li> </ul>	<ul style="list-style-type: none"> <li>Survey (n=279, RR: 83.78%)</li> </ul>	Cross-sectional data	User	China	City	<ul style="list-style-type: none"> <li>Descriptive statistics (frequencies and proportions)</li> <li>Measures of dimensionalities (Structural Equation Modelling)</li> </ul>	TPB framework
10	Li et al. (2018)	Theory building	MIX	Single case study; survey	<ul style="list-style-type: none"> <li>Questionnaire survey (online, pen-and-paper)</li> <li>Interview</li> </ul>	<ul style="list-style-type: none"> <li>Questionnaire survey (including online survey, n=300, pen-and-paper, n=100), the final valid questionnaire (n=380, RR: 95%)</li> </ul>	Cross-sectional data	User	China	City	<ul style="list-style-type: none"> <li>Descriptive statistics (frequencies and proportions)</li> </ul>	N/A
11	Sun (2018)	Theory building	MIX	Single case study; survey	<ul style="list-style-type: none"> <li>Documentation</li> <li>Questionnaire survey (online)</li> <li>Interview</li> </ul>	<ul style="list-style-type: none"> <li>Online survey (n=260)</li> <li>Interviews (n=4)</li> </ul>	Cross-sectional data	User; volunteer; scholar; local community worker	China	City	<ul style="list-style-type: none"> <li>Descriptive statistics (frequencies and proportions)</li> <li>Interview (thematic analysis)</li> </ul>	N/A
12	Peng et al. (2018)	Theory building	QUAL	Single case study	<ul style="list-style-type: none"> <li>Documentation</li> </ul>	<ul style="list-style-type: none"> <li>Public-media document (n=28)</li> </ul>	Cross-sectional data	Not explicitly defined	China	Country	<ul style="list-style-type: none"> <li>Grounded approach analysis</li> </ul>	N/A

Reference	Purpose	Methodology	Research design	Method							Theoretical framework	
				Data collection	Implementation			Data analysis				
					Sample size	Time horizon	Type of respondent		Geographical distribution			
									Region	Level of region		
13	Cheng and Qi (2018)	Theory building	QUAL	Multiple case studies	• Documentation	• Local policy documents (n=15)	Cross-sectional data	Not explicitly defined	China	City	Thematic coding	N/A
14	Fan (2018)	Theory building	QUAL	Multiple case studies	• Documentation	• Local policy documents (n=9)	Cross-sectional data	Not explicitly defined	China	City	Not explicitly defined	N/A
15	Zheng and Li (2018)	Theory building	QUAN	Single case study; survey	• Survey	• Survey (n=400)	Cross-sectional data	Not explicitly defined	China	City	• Descriptive statistics (frequencies and proportions)	N/A
16	Lin (2018)	Theory building	QUAL	Multiple case studies	• Documentation	Not explicitly defined	Not explicitly defined	Not explicitly defined	China	City	Not explicitly defined	N/A
17	Yang et al. (2019)	Theory building	QUAL	Single case study	• Documentation • Interview and discussion	Not explicitly defined	Cross-sectional data	Not explicitly defined	China	Country	• Dynamic feedback analysis	Analytical framework of DBSP sustainability performance
18	Wang et al. (2019)	Theory building	QUAN	Single case study; survey	• Documentation • Questionnaire survey (online)	• Surveys (n=1110)	Cross-sectional data	Citizen	China	Country	• Descriptive statistics (frequencies and proportions) • Measures of dimensionalities (correlation, regression analysis)	N/A
19	Gu et al. (2019)	Theory building	QUAL	Single case study	• Documentation	Not explicitly defined	Not explicitly defined	Not explicitly defined	China	Country	Not explicitly defined	N/A

Reference	Purpose	Methodology	Research design	Method								Theoretical framework
				Data collection	Implementation			Data analysis				
					Sample size	Time horizon	Type of respondent		Geographical distribution			
									Region	Level of region		
20	Zhang et al. (2019)	Theory building	QUAL	Single case study	• Documentation	• Policy documents (n=352)	Cross-sectional data	Not explicitly defined	China	Country	Content analysis; thematic analysis; keyword analysis	N/A
21	Fang and Yang (2019)	Theory building	QUAL	Single case study	• Documentation	Not explicitly defined	Cross-sectional data	Not explicitly defined	China	Country	Not explicitly defined	Multiple streams framework LAD model
22	Yang et al. (2019)	Theory building	QUAL	Single case study	• Social media data	• Social media data (n=5475)	Cross-sectional data	Not explicitly defined	China	Country	Thematic analysis; keyword analysis	
23	Gu and Zhang (2019)	Both	MIX	Single case study; survey	• Questionnaire survey (online) • Interview • Non-participatory observation	• Online survey (n=400, RR: 72.5%) • Interviews (n=14)		Government official; company staff; user	China	City	• Descriptive statistics (frequencies and proportions) • Measures of dimensionalities (regression analysis)	Co-production framework
24	Wu et al. (2019)	Theory building	QUAN	Single case study; survey	• Questionnaire survey (online)	• Online survey (n=1960)	Cross-sectional data	User	China	Country	• Descriptive statistics (frequencies and proportions) • Measures of dimensionalities (regression analysis)	N/A

Reference	Purpose	Methodology	Research design	Method							Theoretical framework	
				Data collection	Implementation			Data analysis				
					Sample size	Time horizon	Type of respondent		Geographical distribution			
									Region	Level of region		
25	Ma et al. (2019)	Theory building	QUAL	Multiple case studies	<ul style="list-style-type: none"> <li>• Documentation</li> <li>• Interview</li> <li>• Participant observation</li> </ul>	• Interviews (n=50)	Cross-sectional data	Government official; company staff; volunteer; scholar	China	City	Not explicitly defined	N/A
26	Hauf and Douma (2019)	Theory building	QUAL	Multiple case studies	<ul style="list-style-type: none"> <li>• Documentation</li> </ul>	Not explicitly defined	Not explicitly defined	Not explicitly defined	China	City	Not explicitly defined	N/A
27	Ma et al. (2019)	Theory building	QUAL	Multiple case studies; focus group	<ul style="list-style-type: none"> <li>• Participant and non-participant observation</li> <li>• Interview</li> <li>• Multiple stakeholder meetings</li> <li>• Survey questionnaire (online)</li> </ul>	Not explicitly defined	Not explicitly defined	Not explicitly defined	Cross-country	City	Not explicitly defined	N/A
28	Zhao and Wang (2019)	Theory building (both)	QUAN	Single case study; survey	<ul style="list-style-type: none"> <li>• Survey questionnaire (online)</li> </ul>	• Online survey (n=395, RR: 83%)	Cross-sectional data	User	China	City	<ul style="list-style-type: none"> <li>• Descriptive statistics (mean)</li> <li>• Measures of dimensionalities (regression analysis)</li> </ul>	Framework based on the theory of planned behavior (TPB) and motivation theories
29	Wang et al. (2019)	Theory building	QUAL	Multiple case studies; focus group	<ul style="list-style-type: none"> <li>• Documentation</li> <li>• Interviews</li> <li>• Stakeholder workshops</li> <li>• Participant observation</li> </ul>	• Interviews (n=2)	Cross-sectional data	Government official; company manager; scholar	China	City	Grounded approach analysis	N/A
30	Hirsch et al. (2019)	Theory building	QUAL	Multiple case studies	<ul style="list-style-type: none"> <li>• Documentation</li> </ul>	Not explicitly defined	Cross-sectional data	Not explicitly defined	North America	City	Not explicitly defined	N/A

Reference	Purpose	Methodology	Research design	Method							Theoretical framework	
				Data collection	Implementation			Data analysis				
					Sample size	Time horizon	Type of respondent		Geographical distribution			
									Region	Level of region		
31	Jiang et al. (2019)	Theory building	QUAN	Single case study; survey	<ul style="list-style-type: none"> <li>Interviews (in the field)</li> <li>Questionnaire survey (online)</li> </ul>	<ul style="list-style-type: none"> <li>First stage online questionnaire survey (n=235, RR: 97.9%)</li> <li>Second stage online questionnaire survey (n = 245, RR: 96.5%)</li> </ul>	Cross-sectional data	User	China	Country	<ul style="list-style-type: none"> <li>Descriptive statistics (frequencies and proportions)</li> <li>Statistical interpretation of parameters (factor analysis)</li> </ul>	N/A
32	Yin et al. (2019)	Theory building	QUAL	Single case study	<ul style="list-style-type: none"> <li>Social-media data analysis</li> </ul>	<ul style="list-style-type: none"> <li>Social-media data (1847 Sina Weibo tweets)</li> </ul>	Cross-sectional data	User	China	Country	Thematic analysis	N/A
33	Wang and Ahsan (2019)	Theory building	MIX	Single case study	<ul style="list-style-type: none"> <li>Interview</li> </ul>	<ul style="list-style-type: none"> <li>Interviews (n=18)</li> </ul>	Cross-sectional data	User and others	China	Country	Coarse risk analysis	Risk management framework
34	Li (2019)	Theory building	QUAL	Multiple case studies	<ul style="list-style-type: none"> <li>Documentation</li> <li>Interview (short casual conversations with key stakeholders)</li> </ul>	<ul style="list-style-type: none"> <li>Face-to-face interviews (n=10)</li> <li>Short casual conversations (n=20)</li> </ul>	Cross-sectional data	Government official; user	China	Country	Not explicitly defined	Three government strategies and two governance styles
35	Qi et al. (2019)	Theory building	QUAL	Multiple case studies	<ul style="list-style-type: none"> <li>Documentation</li> </ul>	Not explicitly defined	Cross-sectional data	Not explicitly defined	China	Country	Comparative historical analysis	N/A



Reference	Purpose	Methodology	Research design	Method							Theoretical framework	
				Data collection	Implementation			Data analysis				
					Sample size	Time horizon	Type of respondent		Geographical distribution			
									Region	Level of region		
36	Sun et al. (2019)	Theory building	QUAN	Multiple case studies; survey	• Questionnaire survey (online and face-to-face)	• Questionnaire survey (n=874, RR: 85.7%)	Cross-sectional data	User	China	City	• Descriptive statistics (frequencies and proportions) • Measures of dimensionalities (Structural Equation Modelling) Content analysis	A theoretical framework of users' civilized cycling behaviors
37	Liu et al. (2019)	Theory building	QUAL	Single case study	• Documentation	Not explicitly defined	Cross-sectional data	Not explicitly defined	China	Country	Content analysis	N/A
38	Wang and Dai (2019)	Theory building	MIX	Multiple case studies; survey	• Documentation • Interview • Non-participant observations • Survey questionnaire	• Interview (n=81)	Cross-sectional data and longitudinal data	Government official; company manager; scholar; industry association; user	China	Country	• Descriptive statistics	N/A
39	Xu and Wang (2019)	Theory building	QUAL	Single case study	• Documentation	Not explicitly defined	Not explicitly defined	Not explicitly defined	China	Country	Not explicitly defined	N/A
40	Gao et al. (2020)	Theory building	QUAN	Single case study	• Survey questionnaire (face-to-face)	• Questionnaire survey (n=453, RR: 88.6%)	Cross-sectional data	User	China	City	• Descriptive statistics • Statistical interpretation of parameters (mixed logit model)	The theoretical model for policy compliance

Reference	Purpose	Methodology	Research design	Method							Theoretical framework	
				Data collection	Implementation			Data analysis				
					Sample size	Time horizon	Type of respondent		Geographical distribution			
									Region	Level of region		
41	Wang et al. (2020)	Theory building	QUAL	Multiple case studies; focus group	<ul style="list-style-type: none"> <li>Documentation</li> <li>Interview</li> <li>Multiple stakeholder meetings</li> </ul>	<ul style="list-style-type: none"> <li>Interview (n=7)</li> </ul>	Cross-sectional data	Government official; company staff; user; scholar	China	City	Grounded approach analysis	with shifting bikes (TPB) A model of PPC reinvention
42	Han (2020)	Theory building	QUAL	Single case study	Media reports	Not explicitly defined	Cross-sectional data	Not explicitly defined	China	Country	Thematic analysis	Actors, policies and technology in dockless bike-sharing – a framework of analysis
43	Chen et al. (2020)	Theory building (both)	MIX	Single case study	<ul style="list-style-type: none"> <li>Interview</li> <li>Non-participant observations</li> <li>Survey questionnaire</li> </ul>	<ul style="list-style-type: none"> <li>Questionnaire survey (n=2095)</li> </ul>	Cross-sectional data	Citizen	China	Country	<ul style="list-style-type: none"> <li>Measures of dimensionalities (regression analysis)</li> </ul>	Co-governance framework
44	Choi and Choi (2020)	Theory building (both)	QUAN	Single case study	<ul style="list-style-type: none"> <li>Survey questionnaire (Online)</li> </ul>	<ul style="list-style-type: none"> <li>Questionnaire survey (n=317)</li> </ul>	Cross-sectional data	Professional; citizen	China	Country	<ul style="list-style-type: none"> <li>Descriptive statistics (frequencies and proportions)</li> </ul>	SME model
45	Waes et al. (2020)	Theory building	QUAL	Multiple case studies	<ul style="list-style-type: none"> <li>Documentation</li> <li>Interview</li> </ul>	<ul style="list-style-type: none"> <li>Interview (n=8)</li> </ul>	Cross-sectional data	Company staff; scholar	Cross-country	City	<ul style="list-style-type: none"> <li>Thematic coding</li> </ul>	Framework of geographical and

Reference	Purpose	Methodology	Research design	Method							Theoretical framework	
				Data collection	Implementation			Data analysis				
					Sample size	Time horizon	Type of respondent		Geographical distribution			
									Region	Level of region		
46	Laa and Emberger (2020)	Theory building	QUAL	Multiple case studies	<ul style="list-style-type: none"> <li>Documentation</li> </ul>	Not explicitly defined	Not explicitly defined	Not explicitly defined	Austria	City	Not explicitly defined	institutional elements N/A
47	Chi et al. (2020)	Theory building (both)	QUAN	Single case study	<ul style="list-style-type: none"> <li>Interview</li> <li>Survey questionnaire</li> </ul>	<ul style="list-style-type: none"> <li>Interview (n=5 pilot)</li> <li>Survey questionnaire (n=466, RR: 83.05%)</li> </ul>	Cross-sectional data	Not explicitly defined	China	Country	<ul style="list-style-type: none"> <li>Descriptive statistics (frequencies and proportions)</li> <li>Measures of dimensionalities (structural equation models)</li> </ul>	SDT and SOR model
48	Li et al. (2020)	Theory building (both)	QUAN	Single case study	<ul style="list-style-type: none"> <li>Platform data (crawler technology)</li> </ul>	Not explicitly defined	Cross-sectional data	Not explicitly defined	China	City	<ul style="list-style-type: none"> <li>Descriptive statistics</li> </ul>	STO model
49	Tian (2020)	Theory building	QUAL	Single case study	<ul style="list-style-type: none"> <li>Documentation</li> <li>Interview</li> </ul>	Not explicitly defined	Cross-sectional data	Not explicitly defined	China	City	Not explicitly defined	Supervision model
50	Huang et al. (2021)	Theory building	QUAL	Single case study	<ul style="list-style-type: none"> <li>Documentation</li> </ul>	Not explicitly defined	Cross-sectional data	Not explicitly defined	China	Country	Not explicitly defined	IAD framework; Polycentricity N/A
51	Xiao et al. (2021)	Theory building	QUAN	Single case study	<ul style="list-style-type: none"> <li>Website</li> </ul>	Not explicitly defined	Cross-sectional data	Not explicitly defined	China	City	<ul style="list-style-type: none"> <li>Descriptive statistics (frequencies and proportions)</li> <li>Measures of dimensionalities</li> </ul>	

Reference	Purpose	Methodology	Research design	Method							Theoretical framework	
				Data collection	Implementation			Data analysis				
					Sample size	Time horizon	Type of respondent		Geographical distribution			
									Region	Level of region		
52	Liu and Niu (2021)	Theory building	QUAN	Single case study	<ul style="list-style-type: none"> <li>Documentation</li> </ul>	Not explicitly defined	Cross-sectional data	Not explicitly defined	China	Country	<ul style="list-style-type: none"> <li>es (regression discontinuity)</li> <li>Not explicitly defined</li> </ul>	N/A
53	Lin and Spinney (2021)	Theory building	QUAL	Single case study	<ul style="list-style-type: none"> <li>Documentation</li> <li>In-depth interview</li> <li>Observation</li> <li>Group discussions</li> <li>Platform data</li> </ul>	<ul style="list-style-type: none"> <li>Interview (n=14)</li> </ul>	Cross-sectional data	Government official; company staff; industries	China	City	Not explicitly defined	Foucault-inspired work on urban governance
54	Li et al. (2021)	Theory building	QUAN	Single case study	<ul style="list-style-type: none"> <li>Platform data</li> </ul>	Not explicitly defined	Cross-sectional data	Not explicitly defined	China	City	<ul style="list-style-type: none"> <li>Statistical interpretation of parameters (difference-in-differences)</li> </ul>	N/A

**Appendix C** List of Interviewees in Nanjing and Sydney

<b>Nanjing</b>			
<b>Code</b>	<b>Position</b>	<b>Organisations</b>	<b>Category</b>
NJ-G-01	Senior Director	Qinhuai District Urban Administration Bureau	Government
NJ-G-02	Senior Director	Qinhuai District Urban Administration Bureau	Government
NJ-G-03	Senior Director	Gulou District Urban Administration Bureau	Government
NJ-G-04	Senior Director	Qixia District Urban Administration Bureau	Government
NJ-C-01	Senior Director	Meituan	Privately held company
NJ-C-02	Senior Director	Hellobike	Privately held company
NJ-C-03	Senior Director	Hellobike	Privately held company
NJ-A-01	Associate Professor	Southeast University	University think tank
NJ-A-02	Industry Supervisor	Nanjing Polytechnical University	University think tank
NJ-A-03	Professor	Southeast University	University think tank
<b>Sydney</b>			
<b>Code</b>	<b>Position</b>	<b>Organisations</b>	<b>Category</b>
SYD-G-01	Senior Director	City of Sydney Council	Government
SYD-G-02	Senior Director	City of Sydney Council	Government
SYD-G-03	Senior Director	Inner West Council	Government
SYD-G-04	Senior Director	Randwick City Council and Cycling at Transport for NSW	Government
SYD-C-01	Senior Manager	Reddy Go	Privately held company
SYD-C-02	Senior Manager	Lime	Privately held company
SYD-C-03	Senior Manager	Mobike	Privately held company
SYD-C-04	Senior Manager	Lime	Privately held company
SYD-A-01	Director	Institute for Sensible Transport	Research institute
SYD-A-01	Director	University of Technology Sydney	University think tank

**Appendix D Academic symposia and focus group discussions attended**

Academic symposia	1	The academic symposium was organised by Meituan Bike in October 2020.
	2	The academic symposium was organised by Southeast University in August 2020.
	3	The academic symposium was organised by Hellobike (a private DBSS company) in August 2020.
Focus group discussions	1	Focus group discussion with the staff of the Nanjing Transportation Bureau (NTB) in May 2020.
	2	Focus group discussion with the staff of the Nanjing Urban Administration Bureau (NUAB) in July 2020.

## PARTICIPANT INFORMATION SHEET

### *The collaborative governance of dockless bike-sharing schemes in the sharing city: towards sustainable urban living*

#### WHO IS DOING THE RESEARCH?

My name is Jun Cao, and I am a student at UTS. My supervisors are Dr Jason Prior (Principal Supervisor, 02 9514 4960) and Dr Damien Giurco (Co-Supervisor, 02 9514 4978).

#### WHAT IS THIS RESEARCH ABOUT?

This research is to find out about the collaborative governance mechanisms used to manage and improve dockless bike-sharing scheme initiatives. More specifically, this research focuses on the dynamic interactions between multiple stakeholders (e.g., government, private companies, users, social organisations, and scholars) when resolving issues linked to the governance of DBSS, from a collaborative governance (CG) perspective. I am exploring how appropriate governance frameworks and mechanisms can be used in combination with the innovations of DBSS companies to promote sustainable urban living.

#### FUNDING

Funding for this project has been provided by UTS and the Australian Government's Department of Education and Training.

#### WHY HAVE I BEEN ASKED TO PARTICIPATE?

You have been invited to participate in this research because you are a relevant stakeholder in a dockless bike-sharing scheme (such as a government official, company manager, scholar, expert, or user). As the primary researcher, I [Jun Cao] have done a literature review and document analysis, and compiled a list of potential participants. This list has been extended through a 'snowballing' process, where I ask participants who have already been interviewed to nominate or suggest other key participants. If you choose to participate, you will also have the opportunity to nominate others you think could contribute to this study.

#### IF I SAY YES, WHAT WILL IT INVOLVE?

If you decide to participate, your participation will involve an individual interview. Interviews will be conducted either online (via ZOOM), via telephone, or at the participant's place of work (government offices/company offices). The interview location will be selected with consideration for the health and safety of both the researcher and participant, and will follow all protocols made necessary by the current COVID-19 pandemic (e.g., social distancing requirements).

There will be an initial telephone call so I can give you some background on the interview process (20 minutes), some time required to read through the project information sheet and consent form (20-30 minutes), total interview time (80-100 minutes), time to finish up the interview, thank you as a participant and address any questions you may want to ask about the research (10-15 minutes), and a follow-up telephone call if I need to clarify something that you said during the interview (up to 30 minutes). Your participation in my research will be recorded by audio recorder to ensure information is accurately

represented. You will also be given an opportunity to review the transcript of your interview.

#### ARE THERE ANY RISKS/INCONVENIENCES?

Yes, there are some risks/inconveniences. You may be worried that voicing critical or negative opinions will affect collaborative networks of DBSS governance, or may involve some reputational risk to yourself. You may feel inconvenienced by the time commitment. You may feel uncomfortable being observed or recorded during interviews. Finally, there may be increased risk undertaking face-to-face interviews due to the COVID-19 pandemic.

To mitigate these risks, all data collected from the interviews will be anonymous, and I will ensure that comments are not attributable to any one individual. You are free to discuss as much or as little as you would like, and you will also have an opportunity to review your interview transcript. You can take a break or stop the interview at any time, without giving any reason.

To address the issue of safety during the COVID-19 pandemic, you will be able to choose whether you would prefer the interview to be conducted face-to-face or electronically, in accordance with COVID-19 related restrictions in Australia and China.

#### DO I GET PAID FOR PARTICIPATION?

No payment is offered for your participation.

#### DO I HAVE TO SAY YES?

You do *not* have to say yes. Participation in this study is entirely voluntary. It is completely up to you whether or not you decide to take part.

#### WHAT WILL HAPPEN IF I SAY NO?

If you decide not to participate, it will not affect your relationship with the researchers or the University of Technology Sydney. If you wish to withdraw from the study once it has started, you can do so at any time without having to give a reason, by contacting me as primary researcher [Jun Cao ( )].

If you withdraw from the study, your samples will be destroyed, and the study tapes will be erased.

#### CONFIDENTIALITY

By signing the consent form, you consent to the research team collecting and using personal information about you for the research project. All of this information will be treated confidentially. The data will be stored and secured as electronic or digital files. Only I [Jun Cao], as primary researcher, will have access to the data. Your information will only be used for the purposes of this research project, and it will only be disclosed with your permission, except as required by law.

We would like to store your information for future use in research projects that are an extension of this research project. In all instances, your information will be treated confidentially.

The results of my study will be disseminated in the form of a PhD dissertation. It is also anticipated that findings will be presented at conferences or published in peer-reviewed academic journals.



#### WHAT IF I HAVE CONCERNS OR A COMPLAINT?

If you have concerns or complaints about any aspects of this research, please feel free to contact me [Jun Cao ( )] or Dr Jason Prior, my Principal Supervisor [(02) 9514 4960].

You will be given a copy of this form to keep.

#### **NOTE:**

This study has been approved by the University of Technology Sydney Human Research Ethics Committee [UTS HREC]. If you have any concerns or complaints about any aspect of this research, please contact the Ethics Secretariat [Ph.: +61-2-9514 2478 or Email: [Research.Ethics@uts.edu.au](mailto:Research.Ethics@uts.edu.au)] and quote the UTS HREC reference number: **ETH20-5008**. Any matter raised will be treated confidentially and investigated, and you will be informed of the outcome.

Appendix F Consent Form (In English)

CONSENT FORM

**The collaborative governance of the urban sharing economy: A comparative analysis of dockless bike-sharing schemes in Nanjing and Sydney (Protocol code: ETH20 - 5008, Date of approval: 29 June 2020)**

I \_\_\_\_\_ agree to participate in the research project *The collaborative governance of dockless bike-sharing schemes: a comparative analysis of Nanjing and Sydney* being conducted by Jun Cao (ph. \_\_\_\_\_), a doctoral student from the Institute for Sustainable Futures at the University of Technology Sydney (UTS). I understand that funding for this research has been provided by UTS and the Australian Government's Department of Education and Training.

I have read the Participant Information Sheet, or someone has read it to me in a language that I understand.

I understand the purposes, procedures and risks of the research as described in the Participant Information Sheet.

I have had an opportunity to ask questions about my participation in the research and I am satisfied with the answers I have received.

I freely agree to participate in this research project as described and understand that I am free to withdraw at any time without affecting my relationship with the researchers or the University of Technology Sydney.

I understand that I will be given a signed copy of this document to keep.

I agree to be:

Audio recorded

I agree that the research data gathered from this project may be published in a form that:

Does not identify me in any way

I am aware that I can contact Jun Cao or Professor Jason Prior if I have any concerns about the research.

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Name and Signature (participant)      Date

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Name and Signature (researcher or delegate)      Date

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Name and Signature [researcher or delegate]      Date

## Appendix G Participant Information Sheet and Consent Form (In Chinese)

### 访谈信息

**《共享单车的协同治理：南京与悉尼对比研究》(Protocol code: ETH20-5008, Date of approval: 29 June 2020)**

#### 谁在做研究?

我叫曹竣，我是悉尼科技大学的博士研究生。我的导师是 Jason Prior 教授（主管导师，+61 0295144960），Damien Giurco 教授（辅助导师，+61 0295144978）。

#### 研究内容是什么?

我的研究要关注共享单车创新对城市治理的影响。具体来说，我的研究关注共享单车治理过程中不同利益相关者之间的动态交互关系。探讨了解决共享单车问题的治理框架和合作机制，以及怎样能有效地促进健康和可持续的城市生活。

#### 研究基金

我的研究由澳大利亚政府的教育和培训部和悉尼科技大学提供经费支持。

#### 为什么会访谈您

您被邀请参加我的研究，是因为您是共享单车治理中重要的利益相关者和参与者。南京共享单车治理中的利益相关者和参与者包括政府主管部门，共享单车企业，第三方管理和监测机构，社会组织，用户等。研究者通过文献研究和分析，制定了可能的参与者名单，并通过“滚雪球”的方式（要求已经接受过采访的参与者提名其他关键参与者）进一步增加可能的参与者名单。如果方便，也希望您可以推荐更多的可能的访谈对象。

#### 如果您决定参本研究，过程会涉及以下方面

如果您决定参加我的研究，你将与研究者进行一对一的访谈。访谈可以通过 Zoom 或者电话的形式进行，也可以在您的办公室进行。访谈地点的选择将首先考虑到研究者和受访者的健康及安全问题，而且还需要参考目前当地政府对于新冠肺炎的要求。

访谈的过程包括前期沟通（20 分钟），阅读访谈知情同意书（20-30 分钟），访谈时间（80-100 分钟），感谢您的参与以及访谈后的答疑（10-15 分钟），访谈后追问（30 分钟）。为了确保信息的准确性，您的访谈将以语音的形式记录。在访谈记录整理完成后将给您审阅。

#### 参与访谈是否存在风险或者不便?

是的，有一些风险和不便。可能您发表的批评或负面意见会影响共享单车治理的协作网络，也可能给自己带来声誉风险。此外，你可能会因为访谈时间太长而感到不方便。而且，在面试过程中被观察或被记录，您可能会感到不舒服。最后，由于 COVID-19 的影响，进行面对面访谈的健康上的风险可能会有所增加。

为了减少这些风险，从访谈中收集的所有数据将是匿名的，我将确保这些资料不会被署名到任何人的姓名和单位。此外，您可以自由讨论你想讨论的内容，你也有机会检查访谈记录。你可以在任何时候需要休息或停止面试，都不需要给出任何理由。

针对新冠肺炎问题，根据澳大利亚和中国新冠肺炎相关限制，您可以选择面对面还是在线的方式进行采访。

您的参与是否有报酬？

我的研究无法给您提供相应的报酬。

我一定要接受次访谈么？

参与我的研究是完全自愿的，完全由您决定是否参与。

如果我说不，会发生什么？

如果您决定拒绝参与，这个决定不会影响您与研究人员或悉尼科技大学的关系，也不会给您带来任何其他的问题。如果您在访谈已经开始后希望立即退出，您可以在任何时候，而不需要任何理由的情况下退出，您可以随时联系曹竣( )。

如果您退出研究，您的访谈样本将被销毁，您的所有访谈记录将被删除。

保密

通过签署同意书，您同意研究团队收集和使用您的个人信息用于研究项目。所有这些资料都将被保密并存储在专门的电子文件中并加以保护。只有曹竣本人和他的导师才能查看这些数据。除法律规定外，您的信息仅用于本研究项目，并仅在您的许可下披露信息。

我们希望将您的信息存储在研究项目中以备将来使用，这些研究项目是本研究项目的扩展。在所有情况下，您的信息将被保密。

研究结果将以博士论文的形式发表，或在会议上发表，或在同行评议的学术期刊上发表。

如果我有顾虑或需要投诉，怎么办？

如果您有任何相关的问题或者顾虑，请随时联系曹竣( ) 或者 Jason Prior 教授 (曹竣的主管导师, +61 0295144960)。也可以联系顾大松教授 (曹竣在东南大学访问学者期间导师及南京调研期间的合作学者, )。

你将得到一份此表格的复印件或者电子版副本。

**注意：**

这项研究已经得到了悉尼科技大学人类研究伦理委员会 (University of Technology Sydney Human Research Ethics Committee UTS HREC) 的批准。如果您对本次研究的任何方面有任何关注或投诉，请联系伦理秘书处，电话: +61 295142478 或电子邮件: Research.Ethics@uts.edu.au，并引用 UTS HREC 参考编号 (ETH20-5008)。您提出的问题将被保密处理、调查，您将被告知结果。

Appendix H Consent Form (In Chinese)

知情同意书

《共享单车的协同治理：南京与悉尼对比研究》

本人\_\_\_\_\_同意参加悉尼科技大学未来可持续研究中心曹竣博士（电话：\_\_\_\_\_）的课题《共享单车的协同治理：南京与悉尼对比研究》。我已知，该研究由澳大利亚政府的教育和培训部以及悉尼科技大学提供经费支持。

我已经阅读了访谈信息，或者有人已经用我能理解的语言读给我听了。

我明白研究的目的、过程及风险，如访谈信息所述。

我可以就我的参与提出问题，我对得到的答案感到满意。

我自愿同意按以上照所述，参与本研究项目，并理解我可以在任何情况下随时退出，并且不会造成任何影响。

我明白我将会得到一份有我签名的文件的副本

我同意此次访谈被：

R 语音记录

我同意本计划所收集的研究资料，可能会以以下形式发表：

R 在任何情况下不提及本人

我知道如果我对研究有任何疑问，我可以联系曹竣， Jason Prior 教授和顾大松教授。

\_\_\_\_\_ 2020/07/01  
签名 (参与者) 日期

Production Note:  
Signature removed prior to publication.

\_\_\_\_\_ 2020/07/01  
签名 (研究者代表) 日期

**Appendix I** Interview question outline (In English)

<b>Interview questions</b>	<b>Supplementary keywords of interview questions</b>
<b>IQ1</b> What is the development process of DBSS in Nanjing?	<ul style="list-style-type: none"> <li>• Government’s attitude and interests</li> <li>• Basic development strategy and plan</li> </ul>
<b>IQ2</b> What are the key issues in the regulation of DBSS?	<ul style="list-style-type: none"> <li>• Current situation of regulation</li> <li>• Existing problems</li> <li>• Social, economic, cultural, policy</li> </ul>
<b>IQ3</b> In the governance of DBSS, does your organisation collaborate with other relevant organisations (e.g., other government departments, social organisations, companies, university think tanks, etc.)?	None
<b>IQ4</b> In your opinion, why is the collaboration between multiple participants needed? What are the key factors that promote or hinder the establishment of a collaborative framework between your department and other participants in DBSS?	<ul style="list-style-type: none"> <li>• Uncertainty, interdependence, consequential incentives, initiated leadership, etc.</li> <li>• Social, economic and cultural, political, legal and institutional frameworks, conflicts history, trust level, etc.</li> </ul>
<b>IQ5</b> In the collaborative governance of DBSS, what is the role of your organisation? What are the collaborative forms and structures governing relations between your organisation and other participants?	<ul style="list-style-type: none"> <li>• Forms of communication</li> <li>• Discover and define the interests, concerns and values regarding goals, tasks and responsibilities; and the major responsibilities and tasks of government</li> <li>• Clearly understand how to realise these interests through collaboration</li> <li>• Share information</li> <li>• The process of deliberation to address issues, manage conflicts and disagreements and create a shared theory of change: Is it fair? Is it open and inclusive? Is it reasoned and candid? Does each participant have an equal opportunity to give opinions?</li> <li>• The procedural or substantive decisions</li> </ul>

Interview questions	Supplementary keywords of interview questions
<p><b>IQ6</b> How does your organisation and other related organisations consolidate, deepen and promote a collaborative framework?</p>	<ul style="list-style-type: none"> <li>• The level of trust between governments and other participants: Does it change over time? What factors affect the change?</li> <li>• In the process of collaboration, can your department respect and understand other participants' differences and disagreements?</li> <li>• Are other participants trustworthy and credible?</li> <li>• Commitments: Signed charters? Written memoranda? Anything else?</li> <li>• Institutional innovations</li> <li>• Leadership</li> <li>• Knowledge-building activities</li> <li>• Internal or external resources (including financial resources, human resources, etc.)</li> </ul>
<p><b>IQ7</b> What are the outcomes achieved through the collaborative framework? How do you evaluate these outcomes?</p>	<ul style="list-style-type: none"> <li>• Intermediate and final outcomes, intended and unintended outcomes</li> <li>• Efficiency, effectiveness, equilibrium, legitimacy, sustainability</li> </ul>
<p><b>IQ8</b> What are the challenges facing the collaborative governance of DBSS in the future? How will your organisation respond to these challenges?</p>	<p>None</p>



## Appendix J Interview Question Outline (In Chinese)

	访谈问题	重点
背景 与 合 作  框 架 的 建 立	1, 能否介绍一下南京市共享单车从2017年初到迄今为止的发展状况? 比如说经历了哪几个发展阶段?	<ul style="list-style-type: none"> <li>• 基本情况, 经历哪些发展阶段;</li> <li>• 政府的态度及政府对于共享单车发展的基本规划和策略, 这个态度有没有变化;</li> <li>• 政府在监管和治理过程中出现哪些问题, 是什么原因造成的</li> </ul>
	2, 为什么政府职能部门想要构建这样一个政企合作共管共治的模式呢? 这个合作的框架是一蹴而就的还是有一个逐渐形成到落地的过程? 这个过程发展到现在有一个怎样的演化? 有哪些关键事件, 请举例说明?	<ul style="list-style-type: none"> <li>• 哪些因素使得政府部门和企业对于共享单车的管理走向共管共治? 比如, 认识问题不可能由单独的一方来解决, 意识到不同参与者之间的依赖性, 等等。这些有没有达成共识?。</li> <li>• 代表性事件与时间; (2017年1月25日, 联络企业? 城市治理委员会第四次会议首次提出共管共治倡议? 还是什么时间?)</li> <li>• 由谁发起(政府, 企业或其他组织); 社会是否有参与(每个月定期文明倡议活动, 大学, 公司)? 是不是也是一种合作</li> </ul>
	3, 政府和企业对于共享单车合作监管模式的态度是否是一致的? 企业和政府管理的目的是不是不一样? 如果是, 会不会影响合作?	
	4, 南京共享个单车的共管共治模式是扎根在南京这样一个特殊的城市背景下, 那么在您看来, 哪些关键性因素影响了南京共享单车合作管治框架的建立和后期的发展? 比如历史、背景、社会等等。	<ul style="list-style-type: none"> <li>• 社会, 经济, 文化;</li> <li>• 先天的一些制度和法律框架, 比如十部委, 还有南京的《意见》;</li> <li>• 权利分配结构;</li> <li>• 与上下级政府之间关系(行政结构), 来自上级的压力, 区长, 局长的大力推动</li> <li>• 刺激因素(某些领导的个人意愿和影响力, 政绩的需求, 问题严峻, 等等);</li> <li>• 与其他合作者之间的合作和冲突的历史以及彼此间的信任度;</li> </ul>
	5, 共享单车的监管和治理过程中, 贵部门与哪些其他的政府部门或者机构之间开展合作? 这种合作是双边的还是多变的? 在与不同参与者合作的过程中, 贵部门都扮演什么样的角色? 其中最困难的工作是怎样的? 如何克服?	<ul style="list-style-type: none"> <li>• 贵部门所扮演的角色;</li> <li>• 贵部门与其他合作者(企业, 社会)的关系是怎样的, 这种关系中大家是否平等? 是否影响合作治理的推进过程</li> </ul>
合 作 过 程	6, 贵部门与不同的部门或者组织之间的具体的合作方式和过程是怎样的?	<ul style="list-style-type: none"> <li>• 与其他参与者之间合作与交流的形式, 规则和机制(正式合作或非正式合作, 定期的座谈会, 面对面交流, 线上合作, 等等);</li> <li>• 正式的领导结构和权力是怎样的, 是否还存在其他非正</li> </ul>

和 合 作 机 制		<p>式的领导结构；</p> <ul style="list-style-type: none"> <li>• 您认为合作过程应该由哪一方主导；</li> <li>• 是否建立对现存问题的共同的认识和理解；</li> <li>• 是否明确了各自的责任，义务，任务，和共同的目标；</li> <li>• 合作过程中，是否信息共享；</li> <li>• 过程是否公平公正，公开透明，具有包容性；</li> <li>• 参与者是否都有同等的机会去表达自己的想法，是否都能提出有建设性的意见，；</li> <li>• 参与者是否都有决策权？如果不是，那么哪一方享有决策权；</li> <li>• 做决策的过程是怎样的？作出了哪些实质性或阶段性的决策</li> </ul>
	7, 在合作过程中，贵部门和其他合作者之间是如何增强信任、彼此磨合？有什么成功案例或者代表性事件？请举例说明	<ul style="list-style-type: none"> <li>• 如何深化彼此间的相互信任和理解；</li> <li>• 参与者直接是否互相尊重互相信任，能够理解和尊重不同的意见和观点，如果有观点的冲突，解决的方法和机制是怎样的；</li> <li>• 合作框架的内部合法性和价值是否得到所有参与者一致的认可，是否各参与方都认可合作框架可以有效地解决问题；</li> <li>• 大家最后是否可以建立共同的行动目标，对合作的最终目的，合作的宗旨达成共识；</li> <li>• 是否与其他参与者签署过一些合作备忘录或达成其他的一些关于合作的共识或承诺去强化合作的关系（承诺书都履行了吗）？</li> </ul>
	8, 在合作过程中，贵部门和其他合作者之间还采取了哪些有效的方式去促进和实现预期的合作目标？	<ul style="list-style-type: none"> <li>• 制度创新，比如，建立新的行动规则，相关政策和法律法规，等这些制度的创新是否有效的解决了问题并促进了合作框架的可持续性发展，如果不是，为什么；</li> <li>• 制度创新的过程是否公开，透明，且具有包容性；</li> <li>• 高效的领导结构或者某个领导方的个人能力；</li> <li>• 知识构建；</li> <li>• 信息的共享；</li> <li>• 技术手段；</li> <li>• 内部外部资源（财政，人力，等）；</li> </ul>
成 果	9, 您能谈一下目前南京市共享单车的共管共治都取得了哪些成果吗？	<ul style="list-style-type: none"> <li>• 阶段性的或者实质性的成果（比如企业牵头包干，班车或环线运维管理模式，微信互通管理平台，第三方运维，定期文明骑行倡议）</li> </ul>
问 题 和 建 议	10, 在南京市共享单车共管共治中有哪些关键因素？南京市共享单车共管共治目前还面临哪些挑战？具体到贵部门来说，面临哪些挑战？您认为未来应该如何应对这些挑战？	