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Open data governance in smart mobility:
an empirical investigation of Shanghai.

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Preface

This paper is a demonstration of our learning outcomes in a tripartite training program between China, Russia, and Norway (Nord University, East China Normal University, and National Research University Higher School of Economics). And this master thesis marks the end of our studies at Nord University undertaking an M.Sc. in Global Management. We are fortunate to conduct research on Shanghai's open data governance in the field of smart mobility with the curriculum set by this project and our expertise.

18th of May 2022

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Abstract

In the field of smart mobility which is critical in the construction of smart cities, technology development and data opening have become essential research objectives. However, research on open data in smart mobility frequently has a technological focus but there are few studies on open data governance. As a result, the goal of our thesis is to clarify the governance elements of open data in Shanghai smart mobility. In particular, our research questions are: How does open data governance unfold in the field of smart mobility in Shanghai, and what are the main challenges on its way? o answer these questions, we applied datapolis theory and social system theory as theoretical guides. Then we employed the structural observation approach and document analysis method for data collection and data analysis in a case study of three open data platforms in the field of smart mobility in Shanghai.

Our findings are divided into three aspects. First and foremost, the Shanghai government failed to adequately address the requirements of all stakeholders, and citizens' awareness of political participation was poor. Second, open data governance rights are too centralized by the Shanghai government, and other parties involved in the smart mobility field lack appropriate independent governance rights. Third, the Shanghai government relied too much on quantitative data for decision-making and did not adequately absorb the social experience. At the end of our research, we looked into the underlying reasons for the above issues, which included Shanghai's open data development being in its infancy, the government being overly centralized, and value co-creation not being realized among stakeholders.

Our work contributes to past research in various ways with these findings. First, we give a research case study on the subject of smart mobility. Furthermore, we work on the gaps in open data research from the standpoint of public governance. Finally, we add to the larger debate on smart cities and sustainable urbanization.

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1. Introduction

As urbanization deepens and people's living standards rise, people are becoming increasingly keen to solve the problems of resource scarcity, transportation congestion, and pollution produced by urbanization (Cuan, 2019). In this situation, the concept of creating a smart city arose. Although there is no clear definition of the smart city so far, it is broadly defined as urban development that includes "investments in human and social capital, traditional (transport) and modern (ICT) communication infrastructure that fuel sustainable economic growth and high quality of life, with wise management of natural resources, through participatory governance" (Caragliu et al., 2011: p.70).

Sustainable urbanism is emerging as one of the hot topics of the twenty-first century, and the notion of a "Smart City" has been offered as a possible solution (Surdonja et al., 2020: p.605). Surdonja et al. (2020) defined a smart city as including several facets of city governance: building, energy, environment, government, living, education, and mobility. Among them, smart mobility is critical for the development of a smart city because one of the characteristics of smart cities is sustainability, yet transportation is one of the few areas where CO_2 emissions are still rising, in other words, it did not realize sustainable yet (Geels, 2012). As a result, smart mobility has becomes a key issue in this area and it is also seen as a key driver because it strives to encourage a more efficient and sustainable mobility system through technological advancements (de Mooij, 2013). Furthermore, "smart mobility is often highlighted as a key system without which the smart city could not be sustainable" (Surdonja et al., 2020: p.604).

According to Benevolo et al.(2016: p.606), smart mobility "could be seen as a set of coordinated actions addressed at improving the efficiency, the effectiveness and the environmental sustainability of cities." To put it another way, smart mobility could include an indefinite number of initiatives that are often (but not always) characterized by the use of "ICT". There have been many studies on how to make mobility smarter through technology (de Mooij, 2013; Molis,2019; Alexander, 2020;

Aifadopoulou,2018; etc.) and most of them mentioned that being able to master data is quite important.

And there are two types of data: "big data" and "open data", Eekhoff et al. (2015) defined open data as data that is publicly available and accessible. In our search for literature, we discovered that the research on big data and smart mobility was relatively adequate (Pasquale, 2019; Muhammad, 2022; Haosheng, 2021; Jens, 2020; Caio, 2021; etc.). However, there is a paucity of literature on open data and smart mobility. According to Aifadopoulou et al. (2018), open data schemes should be pushed in order to foster smart mobility. When compared to those on the technological side, the study on the governance of open data is also sparse (Molis, 2019). Therefore, there are research gaps in "open data in smart mobility" and "open data governance".

As a result of the aforementioned research gaps, our thesis intends to shed light on governance elements of open data in Shanghai's smart mobility development. We chose Shanghai as the research object empirically because of its outstanding achievements in data opening and the enormous need for smart mobility. Furthermore, there is little literature on the emerging new topic of open data in Shanghai, which has a somewhat closed political structure, therefore we believe this research would be worthwhile and interesting. Based on this, our main research questions are: *How does open data governance unfold in the field of smart mobility in Shanghai and what are the main challenges on its way?*

We used Meijer's datapolis theory (2018) as guide for our research. To conduct a case study of Shanghai, we first refer to the three data governance actors proposed by datapolis (state, market, and civil society), and then to the three governance challenges (balancing perceptions, guaranteeing checks and balances, and building upon different forms of knowing), and five governance games (data collection, data storage, data usage, data visualization, and data access). We also used social system theory (Zhu og Fang, 2021), which gives precise assessment indicators for evaluating

the obstacles experienced in five open data governance games, to ensure that our evaluations of challenges are based on objective criteria rather than just our subjective impressions. We believe that combining these two theories is beneficial because the datapolis theory assists us in determining the five games of open data governance, while the social system theory provides us with evaluation criteria for evaluating these five governance games in Shanghai, allowing us to identify the specific issues that Shanghai faces in open data governance in smart mobility.

We chose the Shanghai Municipal Transportation Commission website, Shanghai Public Open Data Platform, and All-in-one Netcom APP as our case study objects. In terms of research methods, we employed structured observation and public document analysis to gather the data we needed. For instance, we downloaded the app and learned about its features, then we read the documents and information published on those platforms and used the induction method to analyze their developments in user interface design, traffic open data functions, open data governance laws, regulations, user interaction channels, and information disclosure to figure out the challenges they face.

We discovered through this study that Shanghai's open data governance in the sphere of smart mobility faces the three challenges proposed by Meijer (2018). First, there is a significant imbalance in terms of balancing the needs of stakeholders, with both legal and ideological restraints at the political and cultural levels. Secondly, in the distribution of governance rights, the rights are basically concentrated in the government, and the governance rights of other stakeholders are severely restricted. Third, in the implementation of decision-making, the government relies too much on quantitative data and fails to absorb social experience well, resulting in a continuous decline in the willingness of the public to participate in governance.

In the end of our research, we also looked into the root causes of these issues, which included the influence of China's unique political context, the fact that Shanghai's open data development is still in its early stages, and a lack of value co-creation

among data governance players. Finally, we came to a complete conclusion regarding the issues in open data governance of smart mobility in Shanghai, why this is happening, what our research's limitations are, and what we can do in the future.

2. Literature review

This chapter is organized as follows. First, we examine the literature on smart city and smart mobility to understand what they mean and how they relate to one another. Second, we define open data and its relationship to smart mobility. Finally, we discuss the existing research on open data governance.

2.1 Smart City and Smart Mobility research

In this section, we will solely review the literature on smart city and smart mobility to present a complete picture of what they are and how they are related, as well as explain why we chose smart mobility as our research field.

Today, more and more people choose to live in cities in the future as urbanization continues to deepen and people's requirements for quality of life improve. According to the United Nations, more than 66 percent of the world's population will live in cities by 2050 (The World Urbanization Outlook, 2018). And the smart city has thus become a global hot topic, because it emerged as a development strategy to address the current problems of urbanization with the central goal of making cities more sustainable (Agbali et al., 2019; UN, 2017; OECD, 2018; Vanolo, 2014; Kitchin, 2015; Meijer and Vanolo, 2015). Perboli et al. (2014) stated the "smart city" concept creates a common vision for the community to build a city that integrates smart technologies, services, and applications into a common platform and enables interoperability and coordination between these sectors to promote the construction of smart cities.

Smart City encompasses various aspects of urban governance, such as energy, building, environment, education, mobility, and so on (Surdonja et al., 2020), with mobility serving as a primary sector in the processes of smart city systems (Rosaria,

2022). Smart mobility is frequently viewed as a key system without which the smart city could not be sustainable (Sanja, 2020). Previous unsmart mobility systems hampered the development of smart cities because they faced multiple challenges such as environmental pollution, natural resource depletion, inefficient infrastructure utilization, and safety concerns (Geels, 2012), and these issues had a significant negative impact on these cities. As a result, we can see that if a city lacks an intelligent transportation system, it will be difficult for it to develop into a truly smart city. According to Surdonja et al. (2020), many smart solutions have been proposed and implemented in the context of smart mobility, which is primarily based on IT, such as e-parking, e-ticketing, and info-mobility signalization, and so on. And these various innovative smart mobility technologies will aid in the development of smart cities so we believe they are complementary.

According to Aifadopoulou et al. (2019), information and communication support, such as big data and open data, is critical for smart solutions in smart mobility, and recent technological advancements have been attributed to an increase in the quality and quantity of mobility-related data. This message conveys to us that, just as Batty (2013) pointed out, data application plays a critical role in the construction of smart mobility: making good use of data can result in a more effective transportation system. There are, however, two types of data: "open data" and "big data". Big data is defined as a dataset that is difficult to process with traditional techniques but open data is defined as data that can be available and accessible to the public (Eekhoff et al., 2015). It seems that big data is more about technology and only with relevant technical knowledge reserves can we conduct this research professionally but we do not have this knowledge so open data which emphasizes pubic governance is more attractive to us.

Therefore, according to the above literature background, we have figured out what is a smart city, what is smart mobility, and we can also see the interaction and mutual support between them. The construction of smart cities provides a basic environment for the development of smart mobility, and smart cities cannot be truly sustainable

without smart mobility. We also found out that data is quite essential in supporting the development of smart mobility. More importantly, we have distinguished the differences between "big data" and "open data" and identified our research interest as "open data". Therefore, in the following section, we will figure out what exactly is open data, and what role and significance it plays in the construction of smart mobility.

2.2 Smart Mobility and Open Data research

In this section, we will discuss what is open data and how it works in smart mobility. As "Open Knowledge Foundation" shows in the open data handbook: "open data is data that can be freely used, re-used and redistributed by anyone-subject only, at most, to the requirement to attribute and share a like" (OKFN, 2022). It also emphasizes the importance of open data characteristics such as availability, access, re-use, redistribution, and universal participation. The Open Data Initiative's goal is not to open all data, but to open all non-personal and non-commercial data, particularly (but not exclusively) data collected and processed by government organizations (Brunswick, 2012). As defined, open data can be used to power the development of smart cities (Jaakola et al., 2015), and it is also can be seen as the first step in involving all stakeholders in the development of a smart city (Ji, 2019). Indeed, open data is an important tool for promoting a "smarter" form of management, particularly in relation to smart mobility (Townsend, 2013). Jappinen et al. (2013) discovered that open data is in high demand in a few specific fields, one of which is smart mobility. Combining the above research findings and given the importance of open data in the construction of smart mobility, it occurs to us that how can we ensure the open quality, open efficiency, and transparency of data opening? That's about open data governance, so in next section, we will figure out the research status of open data governance.

2.3 Open Data Governance research

In this section, we will give out the definition of open data governance. Then we will summarize the current research status of open data governance and explore the

research gap from it.

When it comes to data governance, the term traditionally refers to "the complex set of relations between the political community of citizens and urban data-infrastructures: the political community constructs data-infrastructures and, at the same time, these data-infrastructures condition relations and interactions in the political community of citizens" (Meijer, 2018: p.2). Meijer's datapolis theory (2018) also highlighted how the construction of smart cities/smart mobility can be understood in terms of "actors", "rules", and "games", and he also defined the challenges in data governance, providing us with a basic logical framework. So, following the guidance of datapolis, we attempt to identify potential challenges that may arise during the process of open data governance. And, based on the research on open data governance in smart mobility, there are several important factors to consider.

For starters, there are no industry standards for open data governance in smart mobility. Despite the fact that Zohrabi et al. (2021) have proposed a model that focuses on 27 open data influencers and 6 smart city dimensions and the fourth edition of the Open Data Barometer (2017) has combined data from 115 countries and territories to provide a criterion. However, these open data governance indicators are not segmented for specific industries so they are impractical when used in specific cities or fields.

Second, there is no dialogue mechanism in place for open data governance. Ma and Lam (2019), for example, conducted an empirical survey on the laws and permissions, technology and operation, usage level, system and governance, and economy of open data in Hong Kong, China, and the results show that Hong Kong lacks a solid open data policy and the degree of marketization of open data is insufficient, reflecting a lack of dialogue between the government and the market. Walravens et al. (2016) conducted a similar study, using Flemish as the research object, and studying the attitudes, bottlenecks, expectations, and requirements of market stakeholders towards the government's open data governance in the data reuse stage through expert

interviews. The findings revealed that the government failed to establish an effective dialogue platform for stakeholders to communicate, resulting in a low rate of social demand satisfaction.

Therefore, we now understand what data governance is and what challenges may arise during the data governance process. And, after reviewing the literature, we discovered that much research was devoted to specific topics such as smart city, smart mobility, and data governance. However, less is known about open data governance issues in the field of smart mobility in a specific city. This motivates us to choose a specific city to see what problems can arise in the city's open data governance in the field of smart mobility, and we decide to conduct our research in Shanghai. So, specifically, our research questions are: *How does open data governance unfold in the field of smart mobility in Shanghai, and what are the main challenges on its way?* In order to answer these questions, we apply ideas from datapolis theory and social system theory presented below.

3. Theoretical framework

In this chapter, we will introduce the datapolis theory and social system theory that we used in this research, as well as describe in detail the source, definition, specific content, and reasons for choosing these two theories.

3.1 Datapolis theory

The background of datapolis theory (Meijer, 2018) is the unstoppable technological development of smart cities, which is both inevitable and benign. Today, technology is widely regarded as the key to solving most problems, however, the authors contend that technology is not an island of engineering problems, but rather a strategic, political, and valuable option. As a result, the authors are able to combine public sector technology and urban governance in order to develop a public governance perspective on smart cities and conceptualize smart cities as the result of urban

political and administrative interactions.

Data governance, according to Meijer (2018:p.2), is a "complex set of relations between political community of citizens and urban data-infrastructures: the political community constructs data-infrastructures and, at the same time, these data-infrastructures condition relations and interactions in the political community of citizens." This theoretical concept attempts to understand smart city construction in terms of "actors", "rules", and "games", and the theoretical analysis results in the identification of three types of actors (state, market, and civil society), three governance challenges (balancing perceptions, ensuring checks and balances, and building upon different forms of knowing), and five governance games (data collection, data storage, data usage, data visualization, and data access).

When other studies on urban management focus on the impact of technology, this theory focuses on the role of public governance. This way of thinking is uncommon in other urban management articles, and it closely matches our research vision, so we chose it as our theoretical support. Furthermore, while this theory investigates how data governance affects smart city construction, the smart mobility field we investigate is exactly one aspect of a smart city. Because the two topics are mutually compatible so this theory is also appropriate for our research. Finally, the theory's primary object is data, which is identical to ours. As a result, generally, there is a good fit between this theory and our research.

In terms of reliability, this theory is a new theory that has been proposed in recent years, but it is not without theoretical foundations. Meijer proposed in his article that datapolis theory is inspired by Tayor and Williams' "information polity" concept (1991). At the same time, Meijer used various (classical and recent) governance theoretical perspectives to reinforce the theory's professionalism (Greasley and Stoker 2008; Kiser and Ostrom 1982; Kohler-koch and Eising 1999; Salomon and Elliott 2002; Scharpf 1997). Although the author has not conduct a new empirical study in this study, he did use cases published in other scientific literature to support his

research. In conclusion, when the author defined datapolis, he drew on a wide range of other professional studies and empirical evidence in the field. It can be seen that this theory is not the author's own words, he does have the support of theory as well as empirical research, indicating that this theory has sufficient reliability.

3.1.1 Actors and interests

State, market, and civil society are the three types of actors, with the state primarily using data to improve the efficiency and effectiveness of governance (Gil-Garcia, 2012). The market uses data to increase profits, but it can only do so if its use of data can add value to the city. In other words, using data is not entirely free for the market because it must also serve consumers, other businesses, or governments. While civil society uses data to contribute to urban smartness by developing new forms of citizen collaboration to address various urban problems. According to Meijer (2018), civil society smartness can increase when they have access to open government data, and then civil society will help to share the data they have that is valuable for government policy-making. As a result, it is critical for the government to establish a relationship with civil society, and we want to know if the Shanghai government has done so. Furthermore, public-private smartness will increase when the government and companies share data, which means it is also critical to connect the private and public sectors, and we want to know whether companies and the government in Shanghai have this connection.

3.1.2 Challenges

Although collaboration among the three actors will bring hope and power to the construction of smart cities, it will also raise questions about who will own the data and how profits will be divided. Therefore, in this section, we will introduce the three challenges proposed by Meijer (2018).

➢ **Balancing perceptions**

According to datapolis, the first challenge for smart city governance is the governance of urban perception, which means that urban governance should not only rely on government but also pay attention to our stakeholders. Because policy mistakes can occur when only looking at data collected by the government and ignoring other people's opinions. For example, different groups will have different demands for a specific social issue. Even if all of the data is correct, it will not ultimately benefit the vast majority of people if there is disagreement due to different user demands. So, rather than relying solely on quantitative data, we want to use this theory's guidance to investigate whether Shanghai pays attention to the various opinions proposed by various social groups' demands.

➢ **Guaranteeing checks and balances**

The issue of power distribution is the second challenge of data governance. The government collects and owns citizen data, which it then uses to help itself make better decisions. Simultaneously, the government empowers citizens to participate in governance. Then residents with the right to participate have the ability to influence the agenda and decision-making process and the government seeks a relative balance of rights in this manner by this way. However, because access to open data is not entirely equitable, and not all citizens who contribute data have received corresponding rights, the distribution of rights is almost unbalanced between the government and citizens, as well as the government and the market, the market and citizens. The same issue exists between societies, so how can these checks and balances be ensured? One of the goals of our research is to determine whether Shanghai has achieved a balance of power distribution among various groups in the management of open data.

➢ **Building upon different forms of knowing**

Datapolis also stated that decisions are made based on "facts" and that quantitative data is the most important factor. In general, the government will make decisions

based solely on quantitative data, ignoring the impact of individual signals. As a result, people's experiences or other individual signals are not valued in the process of urban governance, resulting in poor decision-making. In this regard, we'd like to see if Shanghai is up to the task.

3.1.3 Games and challenges

The author also proposes in this theory that the governance of urban data entails participating in various "games" related to the various stages of data processing. A key question for data collection in smart city governance is which data about citizens and urban activities should be collected, and whether this process will violate personal privacy or personal interests. And data ownership is a critical issue when it comes to data storage governance. In discussions about personal data, such as medical or school data, there is a growing emphasis on individual citizen control over data (Li et al., 2010). This highlights the growing challenge to the notion that "he who collects the data also owns the data". Owners of data increasingly value their own ownership and control over their data. Therefore, it is necessary to govern data use and the question of whether private data can be used for public purposes is a major point of contention in the data usage process. Although data visualization can make it easier for people to view data, it will inevitably create opportunities for criminals. These individuals may steal data for illegal and criminal purposes. As a result, data visualization management is also critical. A major challenge of data visualization is preventing those from using data for illegal purposes. Because the open data movement sees open data as a public good and the business community sees public data as a valuable commodity, they tend to hide access or simply not disclose it when data owners' interests are violated because they fear losing control of their image and the resulting claims from citizens. Therefore, how to fully guarantee the acquisition of data and at the same time ensure that privacy is not violated is a major challenge in data access.

3.2 Social system theory

Datapolis theory serves as the primary tool for our research but it cannot provide an

empirical research standard for the basic situation of the construction of an open data platform in Shanghai. Therefore, in addition to datapolis theory, we also choose Zhu and Fang's (2021) social system theory as a supporting theory, and we will use the evaluation standard in this theory to carry out our research.

Social system theory is a subset of social technology system theory that is widely used and debated in academia. Dawes et al. (2016) established an ecosystem model of open data governance based on social technological system theory to analyze its existing conditions, legal policies, strategies, and stakeholder relationships in terms of open data. Rahmatika et al. (2019) evaluated and measured the platform's maturity based on open data strategy, leadership and design, laws and regulations, organizational management, and other dimensions. Finally, Chinese scholars (Zhu og Fang, 2021) synthesized the preceding research, improved social system theory, and applied it to open data platform governance, emphasizing the interaction of open data platform technology, external environment, and governance process.

The social system theory branch of this theory was chosen as the research basis because this paper only discusses governance issues other than open data technology. Zhu og Fang (2021) divided open government data platform governance indicators into "Policy standard ecology", "Organizational strategy execution", "Innovative application absorption", and "User-friendly design". The following is a more detailed explanation of these four indicators.

3.2.1. Policy standard ecology

Policy standards are affected by the international environment throughout the platform's operation process and have some governance flexibility. The content will evolve in response to the environment, primarily regulating the use of data and technology to regulate stakeholder behavior. The richer the content of policies and standards, the stronger the binding force on stakeholders' behavior, and the more

standardized the operation of the overall environment, the greater the positive effect on improving the platform ecosystem's maturity.

Table 1: Policy standard ecology

Policy standard ecology	The content of local regulations is perfect	Introduce a legal text on local data openness.
		Standardize the open content and scope of data (the form of expression is compared and confirmed from the policy text or platform theme content, etc., the same below).
		Standardize how data is open.
		Standardize data utilization and data sharing.
		Standardize data openness/information life cycle/security management, etc.
	The standard content is perfect	Introduce standard texts for local data.
		Local classification and hierarchical management of data (some platforms have a hierarchy of data, and use this as a reference, and the policy text mentions that the text is the main one, the same below).
		The data is desensitized at the local level.
		Local standardization platform basic content construction.
		Local governments establish assessment systems.

Source: Zhu og Fang (2021: p.4)

The government, as the data leader, is widely assumed to standardize data behavior in the platform ecosystem through flexible governance. Aside from the policy text, the adoption of data standards and whether the content is standardized will have an impact on the technical system's data quality. As a result, two three-level indexes are designed under the ecological dimension of policy and standard: the content of local laws and regulations is perfect, and the content of standards is perfect.

3.2.2 Organizational strategy execution

Table 2: Organizational strategy execution

		The setting department manages the openness of government data (the general representation is explained at the bottom of the page or in the responsibilities of the open government information organization, the same below).
Organizational strategy execution	Organization and local management settings	Set up a fund guarantee mechanism (generally from the government's financial statements or government information disclosure for comparison and confirmation, the same below).
		Set up a data/information security management mechanism.
		Set up a data/information assurance mechanism.
		Set up an independent body to review data openness.
	Open plan design	Open plan/construction plan (proposal).
		The platform's open schedule is updated on time (year/month/day).
		The open plan differentiates between open data lists.
		The responsibilities of each unit are clearly defined in the content of the open plan.
		The content of the open plan provides future development plans (or data governance solutions) (texts or news reports on official platforms).

Source: Zhu og Fang (2021: p.4)

This dimension primarily consists of organizing and developing open plans, developing open data platforms, establishing open data departments, and implementing and supervising open data. The implementation of an open data platform is influenced by two factors, one is the ability of the organization and local management settings, which is reflected in the arrangement of government data by the government's top level. Specifically, clear objectives should be established in the formulation of an open plan, and organizations should be assisted in overcoming resistance to opening government data and stimulating the potential value of opening government data.

The second factor is organizational execution capability, which is reflected in the organization's understanding of government data opening. For unfamiliar organizational departments, a reduction in this ability will have a significant impact on the improvement of data opening maturity. Organizational and local management settings influence the open data process, whereas the open plan grasp the direction and specific operation mode of government data opening, thus impacting the platform's ecological operation effect. As a result, under the dimension of organizational strategy optimization, two three-level indicators of organizational and

local management setting and opening plan (construction plan) design are designed.

3.2.3 Innovative application absorption

Table 3: Innovative application absorption

Innovative application absorption	Promote the effect of display in product application	Design a window of proactive data product.
		Review data products and reduce the number of low-quality products (managed by review bodies or assigned values through research on how apps are downloaded).
		Keep the diversity of users (product authors vary).
		Product forms and fields are diversified (data product and the field are not unique).
		User-oriented product evaluation
	Social external knowledge support (Stakeholder support)	Inclusion of different stakeholders in the data platform management system (the page provides instructions for collaborators).
		Proactively cooperate with companies (news reports or platform websites themselves, and assigned based on the assessment score of above one , the cooperative unit is for the enterprise).
		Take the initiative to cooperate with scientific researchers (especially referring to cooperative units such as universities and research institutes).
		Open channels for short-term research by non-long-term co-investigators (specifically stakeholders from other fields, such as financial institutions).
		Open data research window to the public (without distinguishing between specific units and regions).
	Knowledge-based community building	Open interactive communication window.
		Provide a mailbox. Telephone and other contact details for feedback.
		Provide feedback forms, questionnaires, feedback windows
		Support dataset error correction, application window,and previous information exposure.
		Provide real-time communication, online consulting services (including intelligent robots).

Source: Zhu og Fang (2021: p.4)

Users play one of the most important roles in the government data access system. As a result, as the platform's primary service object in the platform ecosystem, user convenience, learning ability, and experience should be fully considered in order to improve user efficiency in using the technical subsystem and stimulate the vitality of users' continuous use. In terms of the platform-user ecosystem relationship, the design of the platform portal to provide user usage data is the primary foundation of their symbiotic relationship. As a result, three levels of indicators are established in the dimension of user design: log-in platform design, user help design, and personal data service configuration.

3.2.4 User-friendly design

Table 4: User-friendly design

User-friendly design	Login platform design	The data platform is open to the public.
		Support users to register and login (individual/legal entity).
		Real-name authentication.
		Authentication should be simple (provide email/ mobile phone number / other social accounts, etc.).
		Support login in through common social tools.
	User-assisted design	Provide an introduction of the platform.
		Provide detailed explanations of hot issues which are applicable in the platform.
		Provides platform version change instructions.
		Provide instructions for using the platform.
		Provide user AI service.
	Personal data service settings	Open personal data service settings.
		Personal Data Service Collection.
		Personal Data Service Subscriptions.
		Personal Data Service Sharing.
		Personal data service preference tracking or personalized data analysis.

Source: Zhu og Fang (2021:p.4)

Data users play an important role in the platform ecosystem by creating creative data products that are popular with the general public. Through the use of data, data users create innovative data products that stimulate the deep value of the data platform. To create community functions conducive to stakeholder cooperation, ecological balance necessitates bidirectional cooperative innovation with multiple stakeholders. As a result, three-level indicators of product application promotion effect display, social external knowledge support (stakeholder support), and knowledge community construction design are designed in the dimension of innovation application absorption.

3.3 Summing up theoretical framework

Social system theory is mainly applied to the empirical analysis of Shanghai open data platforms, while datapolis theory is mainly applied to the theoretical analysis. Although the two theories are different in terms of content, the four indicators from social system theory (Policy standard ecology, Organizational strategy execution, Innovative application absorption, and User-friendly design) actually reflect the three

challenges from datapolis theory (Balancing different perceptions of urban problems, Balances in access to urban information Building upon different forms of knowing in urban decision-making). And they are complementary and supportive of each other. (See figure1 below)
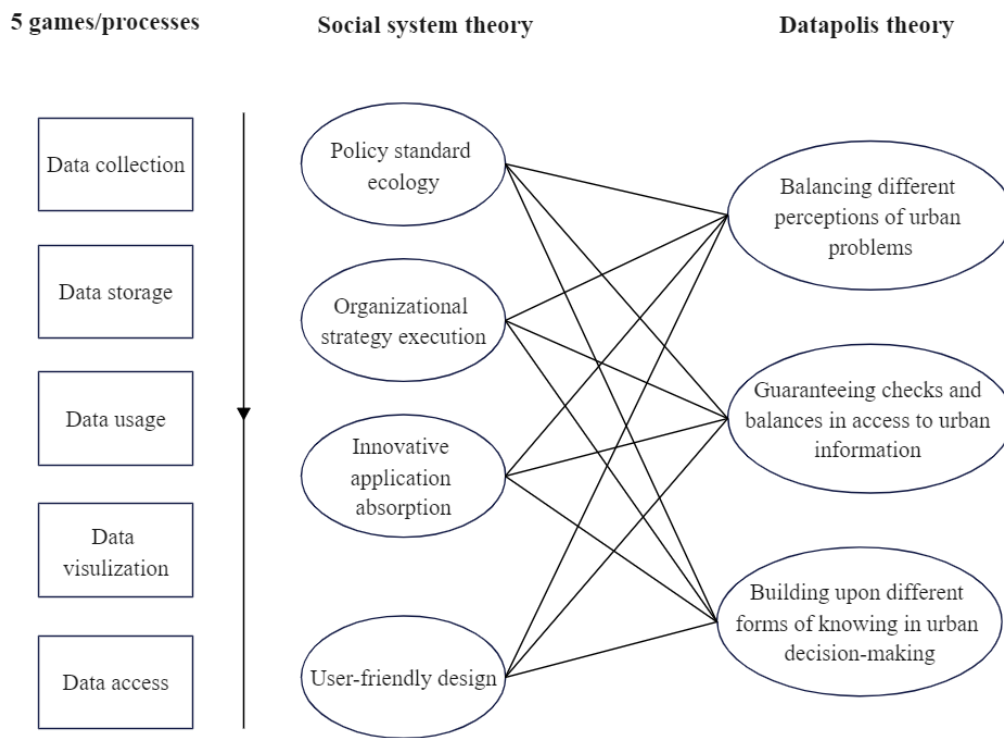
Figure 1: Theoretical framework

The five governance games, in our opinion, are the technical manifestations of open data governance, while the social system theory and the data city-state theory are the political explanations behind the technical presentation and the fundamental manifestation of open data governance.

In the early stage of open data governance, that is, the development stage, it is necessary to balance the needs of different groups. This is also the challenge of balancing different views on urban issues mentioned by the datapolis theory. The needs may come from the diverse needs of user design interfaces and personalized service of data acquisition methods, etc. In the middle stage of open data governance, that is, the policy formulation stage, it is necessary to clarify the issue of power distribution in open data governance, that is, the challenge of ensuring urban

information acquisition checks and balances mentioned in the datapolis theory. This requires the government to pay full attention to the legitimate demands of other stakeholders in terms of data acquisition and storage. In the final stage of open data governance, that is, the implementation stage, market efficiency needs to be considered, which is mainly reflected in the cooperation mechanism of stakeholders. This is also the challenge proposed by the data city theory: building upon different forms of knowing in urban decision-making. This requires the government not to rely too much on quantitative data in the process of data governance, but to fully absorb social experience.

As a result, we will begin our research process by using the four dimensions of social system theory as evaluation criteria to investigate the representative challenges of Shanghai in five open data governance games. Then, we will apply datapolis theory to thoroughly examine the challenges of these five stages and determine the root causes. The method we used in this study will be presented in the following chapter.

4. Methodology

In this chapter, we have three sections which is guided by the "Onion" methodology model proposed by Saunders og Thornhill (2009). In the first section, we identified interpretivism as the research philosophy and research paradigm, then we identified an inductive research approach to guide the study design. The second section is about three Shanghai open data platforms in smart mobility as our case study subjects then we designed our data collection and data analysis methods. The final section discusses our research ethics of reliability and validity, as well as overall limitation of the methodology.

4.1 Research philosophies

Ontology is concerned with the nature of reality. This raises questions about researchers' assumptions about how the world works and their insistence on particular ideas. The first aspect of ontology we discuss is objectivism which portrays the

position that social entities exist in reality external to social actors concerned with their existence. The second aspect, subjectivism, holds the opinion that social phenomena are created from the perceptions and consequent actions of those social actors concerned with their existence" (Saunders og Thornhill, 2009: p.107).

Epistemology is concerned with what constitutes acceptable knowledge in a field of study: "What is acceptable knowledge in a particular field of study?" and axiology is the branch of philosophy that deals with value judgments (Saunders og Thornhill, 2009: p.107). Heron (1996) believes that our values are the guiding cause of all human behaviors.

He further argued that researchers are able to use their values as a basis for judging what research they are doing and how they are doing it, thus demonstrating axiological skills.

On the basis of the above philosophical framework of research, Saunders ogThornhill (2009) analyzed four research philosophies which are Positivism, Realism, Interpretivism and Pragmatism. (See table 5 below)

Table 5: Research Philosophies

	Positivism	Realism	Interpretivism	Pragmatism
Ontology: the researcher's view of the nature of reality or being	External, objective and independent of social actors	Is objective. Exists independently of human thoughts and beliefs or knowledge of their existence (realist), but is interpreted through social conditioning (critical realist)	Socially constructed, subjective, may change, multiple	External, multiple, view chosen to best enable answering of research question
Epistemology: the researcher's view regarding what constitutes acceptable knowledge	Only observable phenomena can provide credible data, facts. Focus on causality and law like generalisations, reducing phenomena to simplest elements	Observable phenomena provide credible data, facts. Insufficient data means inaccuracies in sensations (direct realism). Alternatively, phenomena create sensations which are open to misinterpretation (critical realism). Focus on explaining within a context or contexts	Subjective meanings and social phenomena. Focus upon the details of situation, a reality behind these details, subjective meanings motivating actions	Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research question. Focus on practical applied research, integrating different perspectives to help interpret the data
Axiology: the researcher's view of the role of values in research	Research is undertaken in a value-free way, the researcher is independent of the data and maintains an objective stance	Research is value laden; the researcher is biased by world views, cultural experiences and upbringing. These will impact on the research	Research is value bound, the researcher is part of what is being researched, cannot be separated and so will be subjective	Values play a large role in interpreting results, the researcher adopting both objective and subjective points of view

Source: Saunders ogThornhill,2009: p.116

In our study, we attempt to comprehend the issue from the perspectives of many stakeholders such as the government, residents, and businesses. Furthermore, their requirements, responsibilities, and obligations, as well as potential conflicts are discussed subjectively. Therefore, we consider our research to be more in favor of interpretivism which holds that the social world of business and management is too complex to be established by explicit "laws" like the natural sciences, but is adjusted as we constantly interpret the social world around us (Saunders og Thornhill, 2009).

4.2 Research paradigms

According to Saunders ogThornhill (2009), in order to evaluate, comprehend, and explain social happenings, we must examine philosophical paradigms on a theoretical

basis. Burrell og Morgan (1982) distinguished four sorts of paradigms: functionalism, interpretivism, radical humanism, and radical structuralism. (See figure 2 below)

Radical Change

Radical Structuralism

Radical Humanism

Objectivism ← → Subjectivism

Functionalism

Interpretivism

Social Order
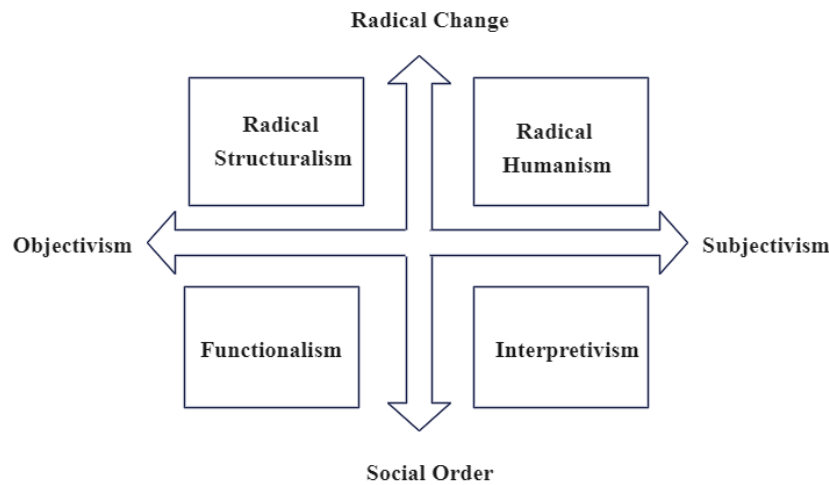
Figure 2: Research Paradigms

Source: Burrell og Morgan ,1979:p.22

In relation to business and management, radical change relates to a judgment about the way organizational affairs should be conducted and suggests ways in which these affairs may be conducted in order to make fundamental changes to the normal order of things. In short, the radical change dimension adopts a critical perspective on organizational life. The regulation seeks to explain the way in which organizational affairs are regulated and offer suggestions as to how they may be improved within the framework of the way things are done at present (Burrell og Morgan, 1979: p.22). The functionalist paradigm, at the objectivist and regulatory level, may be more concerned with a reasonable explanation of why a particular organizational problem occurs and develop a set of recommendations that are set within the current management structure of the current organization. This is how most business and management studies work. The interpretative paradigm may not be to emphasize rationality but to discover irrationality. Radical humanism takes a critical view of organizational life. The Radical Structuralist Paradigm adopts an objectivist perspective to focus on the realization of fundamental psychological changes on the basis of analyzing organizational phenomena such as power relations and conflict

patterns (Burrell og Morgan, 1979).

In our empirical research, we do not attempt to fundamentally change or innovate the open data governance pattern in smart mobility in Shanghai, but rather conduct a subjective "unreasonable" review of the existing development status. Therefore, we advocate the use of an explanatory paradigm to help in practice.

4.3 Research approaches

Before the research begins, we connect our research with the above research philosophy to clarify whether the deductive or inductive approach should be used to study the important questions of project design.

According to Saunders og Thornhill (2009), in deduction, you develop a theory and hypothesis (or hypothesis) and devise a research strategy to test the hypothesis but in induction, you will collect data and develop theories based on the results of data analysis. Creswell (2002) offers some practical criteria. With a topic that is well documented, you can define a theoretical framework and assumptions that are easier to deduce. But if the research is a new topic is an exciting debate and there is not much existing literature, it may be better suited to inductive work by generating data, analyzing, and reflecting on theoretical topics implied by the data. According to this standard, we explicitly use induction for study design.

4.4 Research design

Saunders og Thornhill (2009) believed that the research design influenced the way of answering research questions, it includes the selection of research purpose and question, research strategy, collection, and analysis method.

4.4.1 Research purpose

Our purpose is to research the development level of open data governance in smart mobility, and what are the main challenges on its way. For this reason, our goal is investigative and descriptive to convey a true picture of people, events, or circumstances (Robson, 2002).

4.4.2 Research strategies -Case study

Robson (2002) defines a case study as a strategy for doing research that involves an empirical investigation of a particular contemporary phenomenon within its real-life context using multiple sources of evidence. Due to the centralized market scale of open data platforms in Shanghai, we choose the Shanghai Municipal Transportation Commission website, Shanghai Public Open Data platform, and All-in-one Netcom APP as our study case.

4.4.3 Research choices –Qualitative analysis method

Saunders ogThornhill (2009) consider the quantitative analysis method is predominantly used as a synonym for any data collection technique (such as a questionnaire) or data analysis procedure (such as graphs or statistics) that generates or uses numerical data. In contrast, qualitative is used predominantly as a synonym for any data collection technique (such as an interview) or data analysis procedure (such as categorizing data) that generates or uses non-numerical data. According to our data collection technique and data analysis procedure, we use the qualitative analysis method.

4.4.4 Data collection

In our empirical study, we collected primary data through a structured observation method. The structured observation method involves formulating hypotheses before the observation and planning a standardized approach, i.e., listing the scope of the observation, and the observer determines the observation sample in advance and designs indicators to record the observations (Saunders ogThornhill, 2009)
In practice, we started by generating a list of observation topics that included the four kinds of indicators suggested by social system theory: policy standard ecology, organizational strategy execution, innovative application absorption, and user-friendly design (see Table1,2,3,4 in chapter 3 for details). Secondly, we logged on Shanghai

Municipal Transportation Commission website(http://jtw.sh.gov.cn/), the Shanghai Public Open Data platform (https://data.sh.gov.cn/), and download All-in-one Netcom APP (Apple Store China) to observe the contents of these three platforms according to the above list, namely the four categories of indicators.

On the Shanghai Municipal Transportation Commission website, we observed the public documents of open data governance, including the governance guide of laws and regulations and websites, the directory of open information, the database of open data, and the application function of permit certificate related to traffic, functions of citizen and business complaint, consultation, etc. And on the Shanghai Public Open Data Platform, we observed an open data database of transportation, data visualization function, applications that can link to other open data platforms of transportation, an "Open ecology" function of cooperation, and an interactive forum with other stakeholders, etc. Finally, on the mobile All-in-one Netcom APP, we observed travel services, real-time road conditions, vehicle management, traffic violations, moving and parking, public transport recharge and line query, new energy vehicle management, and other functions.

During the specific observation process, we observed and documented the contents based on the list of four indicators, then sorted and checked them together. Finally, we summarized the primary data of the governance of the Shanghai traffic open data platform. In addition, in terms of secondary data, we supplement the primary data summarized above through the data analysis method, including academic papers, journals, and government documents related to the Shanghai Open Data Platform in the field of smart mobility (see table 6 below).

Table 6: Government document

1	Regulations of Shanghai Municipal Government on Information Disclosure
2	2017-2021 Annual report on government information disclosure of MUNICIPAL Transportation Commission
3	Catalogue of Major Administrative Decisions of Municipal Transportation Commission from 2017 to 2022
4	Regulations of the People's Republic of China on Disclosure of Government Information
5	Key points of Shanghai Municipal Transport Commission's work on government affairs disclosure from 2017 to 2021
6	Measures of the Shanghai Municipal Transportation Commission for the administration of publicity of government affairs
7	Implementation Plan of Shanghai Municipal Government Information Disclosure in the Field of Promoting The Construction of Social Public Welfare Undertakings
8	Performance evaluation report of social satisfaction Index of Transportation industry of Shanghai Transportation Commission
9	Circular of The General Office of the State Council on printing and distributing key Work points for government Openness in 2020
10	Opinions of The General Office of the State Council on promoting government information disclosure in the field of social Public Welfare Undertakings
11	Opinions of The General Office of the State Council on promoting government Information disclosure in the field of public resource allocation
12	Guide to Government Information Disclosure of Shanghai Municipal Transportation Commission

Source: Shanghai Municipal Governance

Finally, we combined primary and secondary data, sorted them out, and evaluated the situation of open data governance in the field of smart mobility in Shanghai according to the four indicators of social system theory.

4.4.5 Data analysis

In the data analysis process, the data we collected, namely, the situation of open data governance in the field of smart mobility in Shanghai, are summarized following the five games proposed by datapolis theory which are Data collection, Data Access, and Data Usage, Data storage, Data Visualization (See 5.3). Then, we used the three challenge frameworks of datapolis theory and conducted a thorough investigation of the first step's inductive results, namely, "Balancing different perceptions of urban problems", and "Guaranteeing checks and balances in access to urban information". (See 6.1). And finally, we explored the essential reasons behind these challenges.

4.5 Research Ethics

The term research ethics refers to a wide variety of values, norms, and institutional arrangements that help constitute and regulate scientific activities. Research ethics is a codification of scientific morality in practice. Guidelines for research ethics specify the basic norms and values of the research community. They are based on general ethics of science, just as general ethics is based on the morality of a society at large (The National Committee for Research Ethics in the Social Sciences and the Humanities, 2022). The data we collected contain information about relevant enterprises and other third parties which means that there is a risk to the ethics of respecting third parties' private rights (The National Committee for Research Ethics in the Social Sciences and the Humanities, 2022). However, we believe the risk is limited because the information presented has been approved by stakeholders. Regarding data sharing, Norwegian Centre for Research Data (formerly NSD) was selected as a platform for "Data storage", "Supervision, and Sharing". The NSD is the largest national research data archive and a data disseminator for researchers and students and assumes the responsibility of a data producer, therefore it has the responsibility to preserve the data and guarantee availability, integrity, consistency, and privacy protection without time limit. In addition, NSD has different contracts with different data producers, and data sets with disclosure risks (personal data) are bound by data processor agreements that describe the characteristics and usage limits of the data. (Norwegian center for research data,2022)

In conclusion, the data we collected from the three platforms (Shanghai Municipal Transportation Commission website, the Shanghai Public Open Data platform, and download All-in-one Netcom APP) confirmed the standard of NSD and we obey the rules which are mentioned above.

4.6 Reliability and Validity

Rogers (1961) summarized scientific methodology needs to be seen for what it truly is, it is a way of preventing me from deceiving myself in regard to my creatively formed subjective hunches which have developed out of the relationship between me

and my material. Reducing the possibility of getting the answer wrong means that attention has to be paid to two particular emphases in research design: reliability and validity.

4.6.1 Reliability

Reliability refers to the extent to which your data collection techniques or analysis processes produce consistent findings (Saunders og Thornhill, 2009) and it asserts that there are four possible threats to reliability. Subject or participant error, subject or subject bias, observer error, and observer bias. The data in our research is derived from the Shanghai government's official open data platforms, which are authoritative, and is cross-checked with other authoritative public documents to verify consistency and dependability.

4.6.2 Validity

Validity is concerned with whether the findings are really about what they appear to be about (Saunders og Thornhill, 2009) and it has also charted the threats to validity which are: "History", "Ambiguity about causal direction", "Generalisability", "Logic leaps", "False assumptions", "Identification of the research population", "Data collection", "Data interpretation", and "Development of conclusions". In order to avoid the above threats and ensure validity, we referred a large number of works of literature and consulted with our supervisor to keep the consistency of research philosophy, research direction, research questions, and data collection and analysis methods. In particular, we collected the data of the Shanghai Smart Mobility Open Data Platform according to the four standard frameworks of social system theory to ensure validity. In order to avoid the subjectivity of our analysis, we chose the norms of social systems theory and datapolis theory to guide our research.

4.7 Limitation

In our research, the case study method has certain limitations. Since only three

websites/platforms are selected which means we may ignore some of the potential problems and challenges of open data platforms in smart mobility.

The structured observation method and the induction method we utilized are subjective, which may affect how we view some problems and challenges. In addition, our standards for data collection and analysis, social systems theory, and datapolis theory are applicable to the broader field of smart cities but lack a guiding framework for the special problems of smart mobility. And it is worth noting that due to the time limitation of paper submission, we only collect data before May 2022. However, because open data is updated in real-time, a vast amount of data over time is awaiting re-analysis.

In summary, in this chapter we first introduced the research philosophy and paradigm we choose is interpretivism, then we confirmed our research question is how open data governance unfolds in the field of smart mobility in Shanghai and what are the main challenges on its way, based on these we choose 3 Shanghai open data governance platforms in smart mobility as our study case, used structured observation and public document analysis method to collect data and adapt induction method to do analysis according to social system theory and datapolis theory. Finally, we discussed our research ethics, reliability and validity, and some limitations. In the next chapter, we will introduce the empirical findings in detail.

5. Empirical findings

In this chapter, first, we will introduce the background of our empirical research and the basic status of the three selected research objects (Shanghai Municipal Transportation Commission, Shanghai Public Data Open Platform, and All-in-one Netcom APP). Then, according to the research framework of datapolis, we will list the actors and their interests in these three open data platforms in smart mobility. Combined with the content of the five governance games in the datapolis theory and the evaluation criteria of the social system theory, we will discuss the challenges that Shanghai encountered in these five governance games. In order to present our

findings more clearly, we also tabulate these findings and present them in each section.

5.1 Empirical background

According to Beibei ding (2021), there is a serious problem with traffic congestion due to the large population, and since we are in Shanghai, we have a local advantage of collecting data, we believe it is worthy and interesting to explore smart mobility governance in order to realize Shanghai's goal of building a super large modern international metropolis (Hao Zhu, 2020).

In recent years, Shanghai has indeed made great achievements in the field of smart mobility. An intelligent transportation system integrating road transportation, public transportation, external transportation, slow traffic, and comprehensive transportation has been basically completed. According to the 2021 China Local Government Data Disclosure Report, Shanghai ranked first among cities in China's forest Index, which also showed that Shanghai had the highest score among the top 20 "Shu Chain" cumulative scores from 2018 to 2021 (Fudan University and State Information Center Digital China Research Institute, 2021). At the same time, Shanghai also attempted for the first time to provide special legislation for data opening - China's first local government regulation specifically for data opening namely "Shanghai Interim Measures for Public Data Opening to regulate public data opening". Besides, at the 2020 Global Smart City Conference, Shanghai was selected from 350 cities around the world to win the "World Smart City Award".

However, in view of the quality of existing achievements, there still have problems such as limited coverage of data resources, poor real-time performance, inability to realize data sharing and exchange, and hidden data collected by major transportation departments (Cuan, 2019). Besides, there is a problem with excessive government control. Specifically, the government determined the open standards and data resources (Jingyun, 2021). Based on this background, we want to find the challenges of segmentation in each governance game.

In regard to platforms, we first chose Shanghai's Public Data Open Platform which has 51 data opening, 100 data opening institutions, 5,692 data sets, and in the road traffic section of this platform, there are 230 traffic-related datasets. These datasets can show us key information such as data publisher, data type, data quantity, download amount, etc., which provided a quantitative base for research. And we also selected Shanghai Municipal Transportation Commission as our case. It is an integrated website for traffic data and document publishing. There are 8 sections: "home page", "government affairs disclosure", "laws and regulations", "one-stop service", "convenience information", "news center", "interactive platform", and "weibo and wechat". Each section has its own subsections, which is more convenient to see the details and each section publishes historical information and the latest information related to the section. In addition to these two websites, the All-in-one Netcom APP provides information about residents' travel habits, such as road congestion, parking space availability, bus arrival time, and so on. All of them are in real-time.

With this whole background of why we choose Shanghai and the specific research platform we select. We carried out our research and aim at understanding the current situation of open data governance in the field of smart mobility in Shanghai, identifying the actors involved in the governance process and their interests, analyzing the challenges encountered in each governance, and exploring the essential reasons behind them. Finally, we hope that our research will provide new governance visions for Shanghai or other cities.

5.2 Actors and their interests

The actors involved in the three research platforms we selected conform to the three types of participants proposed by Meijer (2018). The government is the builder and manager of the platform, presenting the collected data to the public for easy viewing and use. At the same time, the government has a feedback window to collect user experience and suggestions and encourage the public to participate, so as to help government departments make better decisions and achieve value co-creation.

Shanghai Municipal Transportation Commission mainly involves the governmental departments of "Shanghai Public Data Open Platform", "the Shanghai Municipal Road Transport Administration", "the Law Enforcement Corps of the Shanghai Municipal Transportation Commission", and the district government in Shanghai. The market involves those who create business value through those open data. For example, some transportation companies will provide the government with the basic information about the company and the data of the main business to raise awareness among the public, so as to tap potential customers or partners. Such companies will also learn about the development of the industry by looking at the data of other companies in the same industry, so as to formulate corporate strategies and improve the competitiveness of their own. Of course, these companies can also directly use the open data to create value, for example, developing investment opportunities by understanding industry gaps.

Citizens are the main users. According to the 2021 annual work report of the Shanghai Municipal Commission of Transportation, the number of registered users in that year was 64.44 million, the unique user visits amount was 417,947, and the total number of website visits was 2,105,245. They can facilitate their travel/daily life by querying the open road information and vehicle information from the platform, and they can also participate in the political activities of the government's open data platform construction through feedback channels to improve their political status.

5.3 Games and challenges

In this section, we will present our research findings on challenges in every open data governance game.

5.3.1 Data collection

Meijer (2018) claimed that the governance challenge of this game is to organize data collection in a model，that both effectively address urban issues and respects citizens' privacy. Here we also talk about the challenges like insufficient guarantee mechanism

and feedback mechanism, insufficient innovation, and lacking an independent management department, etc.

Table 7: Challenges of data collection

Games \ Index	Policy standard ecology	Organizational strategy execution	Innovative application absorption	User-friendly design
Data Collection	*No law has been enacted to protect personal privacy in data collection. *A lack of stakeholder demand survey policy.	*The data sources are complex, and there is no special data collection department. *The right of data collection and supervision is unclear.	*There are no data collection channels and data collection products that stakeholders can participate in. * There are no innovative data collection methods, and some efficient and wide coverage collection methods have not been adopted.	*The source of data collection is not specified, and it is impossible to determine whether citizens' right to privacy has been violated. Lack of evaluation and feedback function to satisfy stakeholders.

The website of the Shanghai Municipal Transportation Commission provides channels such as "public survey and consultation" to collect public opinion, and the Shanghai Public Data Open Platform has also opened columns such as "interactive community" to encourage citizens to provide data. The government's data collection channels are relatively diverse, including official websites and telephones, Weibo and WeChat (Chinese social platforms), and All-in-one Netcom APP. Citizens can directly provide data information in the "Online Complaints", "Online Suggestions" and "Director's Mailbox windows" on the website, and the platform will publicize it to users through "Open Cases". You can also make relevant suggestions or provide data to the Shanghai Municipal Transportation Commission through the email or telephone.

However, all the data displayed on the website only indicates the final source, and there is no explanation of where the original data was collected. That means we don't know whether the government has violated the legitimate rights and interests of data owners or not. And from the perspective of legislation, for a long time, the Chinese government has attached great importance to keeping the secrets of government work but has seriously neglected the citizens' right to know and the protection of personal privacy. This imbalance exists in the disclosure of government information (Gang,

2017). Regarding the protection of personal privacy in the process of data opening, the subsection in the "Shanghai Data Regulations" publishes relevant regulations, but does not have detailed guidelines for which information belongs to personal privacy. Although citizens can defend their rights and interests through litigation, it will consume a lot of time, money, and energy. Therefore, there is a risk that citizens will not have relevant legal evidence to prove their privacy has been violated.

5.3.2 Data access

Meijer (2018) pointed out that what the data access section faced is the challenge of finding forms of storage that facilitate smartness while not impinging on legitimate forms of ownership. We also listed the challenges of ambiguous definition of rights, low efficiency, lacking innovative mechanisms and diverse designs, insufficient transparency, and so on.

Table 8: Challenges of data access

Games ╲ Index	Policy standard ecology	Organizational strategy execution	Innovative application absorption	User-friendly design
Data Access	*The government has the right to interpret the laws related to data access, and the scope of reasonable interpretation is not clear.	*After the user puts forward the demand, the government's implementation cycle is too long and the efficiency is low.	*Lack of objective discussion platform for stakeholders on data acquisition channels.	*In order to obtain the final desired data, users need to jump to the platform, which is not convenient enough. *Traditional data acquisition channels, low penetration rate and low user friendliness of data channels.

In terms of data acquisition, there are two main ways to acquire data on the existing open data platforms in Shanghai. One is for the information that has been published on the platform which is classified in the public column. The public can access the official website of the Shanghai Municipal Transportation Commission, the All-in-one Netcom App, the WeChat public account, Weibo (China social platform), and other social channels. The other is for data that has not yet been made public. Citizens can only apply to government departments. However, the Shanghai Municipal Government Information Disclosure Regulations clearly state: If the application

content has been disclosed and the citizens cannot find it, the citizens will be informed of the methods and channels to obtain the information. For information that can be disclosed but has not been disclosed, applicants can apply according to the process, and relevant departments will reply within 20 working days. (Shanghai Municipal Transportation Commission,2021)

It can be seen that the waiting time is quite long, and the application may not be successful in the end. It is also shown if the required data cannot be disclosed, the government will inform the applicant of the non-disclosure and explain the reasons. This means the standard of public non-disclosure is entirely determined by the government, and the regulations do not indicate in what term can those data be disclosed, especially when there are many people who need it. Shanghai Municipal Government Information Disclosure Regulations also state that if the number and frequency of applications obviously exceeds a reasonable range, the administrative organ may charge an information processing fee. But "reasonable range" is vague, and it violates the definition of open data, citizens can view open data for free at any time and anywhere.

5.3.3 Data usage

What Meijer (2018) proved of the challenge of data usage is facilitating the usage of data for tackling urban problems while guaranteeing that this does not harm citizens or stakeholders. Here we add the challenges of lacking a balance mechanism among stakeholders, lacking stakeholder cooperation and personalized services, etc.

Table 9: Challenges of data usage

Games \ Index	Policy standard ecology	Organizational strategy execution	Innovative application absorption	User-friendly design
Data Usage	*A lack of stakeholder needs survey policy.	*A lack of mutual check and balance mechanism for the use rights of stakeholders of all parties. Lack of provisions on the right to use, the right to supervise and the right to explain. *There are many levels of responsibility division among departments, the efficiency is low, and the response time is too long for the use needs put forward by users.	*User participation is not high, and there is no in-depth cooperation between the government and users.	*Lack of awareness of user needs and personalized services for users. *There is also a risk of privacy disclosure in the process of data use.

The website of the Shanghai Municipal Transportation Commission provides two open databases. The first is "convenience inquiry" which provides specific information about the qualification of traffic movement, the schedule of urban public transportation, road administration management, inter-provincial road passenger, road freight transportation, public parking, automobile repair and driving training, non-commercial passenger car quota management, port shipping, and missing approval documents. There are specific sub-columns under each column for citizens to view. The second is the "Shanghai Public Data Open Platform". This database provides 230 data resources of road traffic, including 36 data interfaces, such as public tunnels, urban overpasses, etc., and 194 data products, such as road reconstruction, a directory of port operating companies, etc.

The "All-in-one Netcom" app mainly provides data query services from specific types of transportation. For example, non-motor vehicles, taxis, new energy vehicles, subway, bus traffic, traffic card recharge, parking, leasing, and other services. Besides, it provides professional qualification certificates for transportation-related practitioners and the handling of business licenses for transportation-related enterprises and related departments. "Convenience Reminders" and "News Center"

windows provide real-time, sudden traffic information announcements like temporary road traffic during the new coronavirus. And "Government Information Disclosure System and Guidelines", "Policy Document", and "Knowledge Base" window provide platform data open policy guidance, and traffic-related legal and regulatory documents to help users understand platform usage, supervision channels, and relevant legal information.

The Shanghai Municipal Commission of Transportation satisfies the indicators of policy standards and organizational strategy implementation to some extent, but lacks support for stakeholders in the adoption of innovative applications, according to social subsystem indicators. The platform does not have a window for collaborative governance for research institutions, the non-research public, and companies. In the user usage design indicators, the Shanghai Public Data Open Platform provides a variety of log-in methods and social tool use channels but lacks user assistance in design and personal data service settings.

Based on the analysis of the Shanghai Public Data Open Platform, we found out that the participation forms of platform users only stay in the stage of informative and consultative participation. Government-enterprise cooperation (cooperation agreements) and government-society cooperation (public opinion surveys) are mainly reflected in the "Open Ecology" project, but it is still only at the demonstration and experimental stage. The platform has not yet established a common governance window for stakeholders in some functions, such as open data website construction, technical specification, standard development, civil servant training, database construction, and technical R&D. In terms of user privacy, there is a certain risk on this game. For example, in the "All-in-one Netcom" app, users need to enter their personal identity documents and bank account-related information to log in to use public transportation to inquire, purchase tickets, rentals, and other services. In the use of vehicles, the frequent leakage of QR codes is also a serious privacy problem. In addition, the platform-related privacy protection is lacking in the grievance clause.

5.3.4 Data storage

According to Meijer (2018), the challenge in data storage is providing forms of visualization that facilitate debate with insights while not limiting it by leaving out crucial perspectives. And what we found out are also including the challenges of complex page design, lacking personalized services, and a blocking mechanism for illegal use of data, etc.

Table 10: Challenges of data storage

Games　　　　Index	Policy standard ecology	Organizational strategy execution	Innovative application absorption	User-friendly design
Data Storage	*A lack of explanation on the participation rights and degree of stakeholders, without considering the participation needs of stakeholders. *Without explaining the ownership of data storage rights.	*The data storage department has many levels and low efficiency. *The data storage mode is single, lack of timeliness. *The storage form is highly centralized and confidential.	*Data storage is in static mode, but not more intelligent dynamic storage, so there is a lack of innovation in general.	*Users cannot know how data is stored. * There are no diversified data storage methods for users to view.

As shown in Figure 3 below, at present, the main data storage bodies of the Shanghai Public Data Open Platform are the relevant government departments. The General Office of the Shanghai Municipal Government is the competent authority for open data and is responsible for the overall planning and supervision of data storage. Shanghai Big Data Center is responsible for the construction and operation of the e-government extranet, e-government cloud, big data resource platform, and Shanghai e-government disaster backup data. Shanghai implements the management of non-confidential data systems at the city and district levels. In the principle of the political system of Shanghai, the storage of data cannot be across departments or levels. Rebuilt data center computer rooms, data storage, and integration of all levels and departments need to be connected with the Shanghai Big Data Center. The data collection and verification are undertaken by various departments, and the overall data quality is also supervised by the Big Data Center. Then the Shanghai Municipal

Economic Information Department and other agencies are responsible for coordinating and promoting the work of the Big Data Center. In the field of transportation and mobility, the storage of information is mainly in charge of the Shanghai Municipal Transportation Commission, the Shanghai Traffic Law Enforcement Department, and the Shanghai Road Transport Administration.
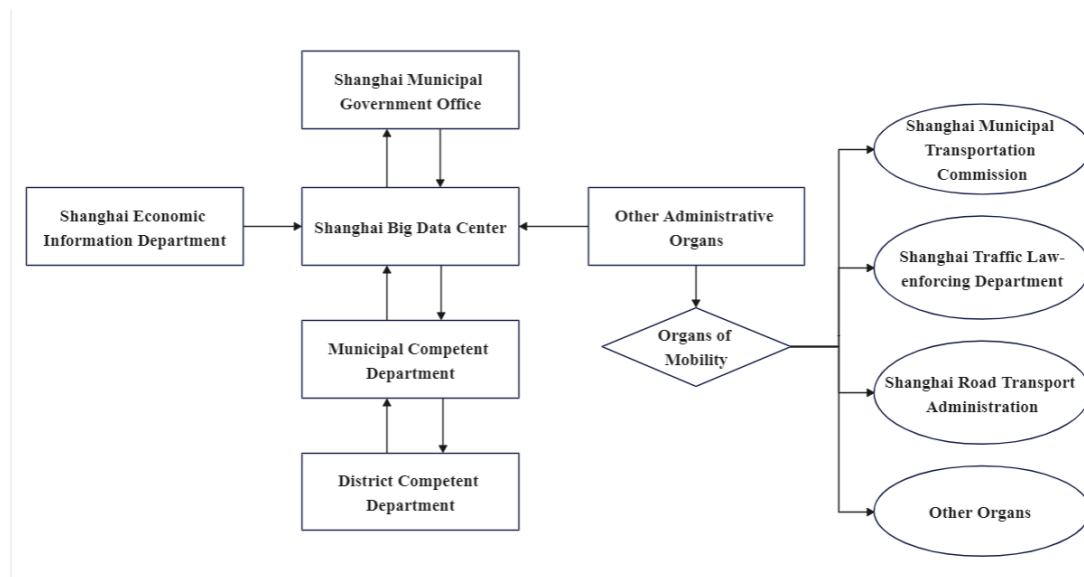

Figure 3: Data storage and management model diagram of Shanghai Municipal Transportation Commission

Source: Shanghai Municipal Transportation Commission

From the perspective of the ecological dimension of policy standards, Shanghai's traffic open data storage regulations and standards are relatively complete, but in terms of organizational strategy implementation, due to the data storage framework involves too many levels, and there are many constraints among various departments, there may be inefficiencies in the implementation process. From the perspective of innovative application absorption, the website also lacks an intelligent storage mode. At present, the entire data viewing method is relatively old-fashioned, and the data presentation modes are mostly static modes such as CSV and XLS forms, which cannot be updated in real-time and cause the useless of data. Although we found All-in-one Netcom app can realize some real-time updates, the penetration is low. Therefore, it can be concluded that the data storage of the Shanghai transportation department currently does not provide a channel for cooperation from social

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stakeholders (companies that can provide a more intelligent governance model) and the highly centralized model has brought some challenges to the innovation of data storage technology.

5.3.5 Data visualization

In terms of data visualization, Meijer (2018) proposed that the challenge is about enabling and stimulating access to data but restricting it in the case of legitimate objections such as privacy and security. In our research, we also noticed the challenges of insufficient legal protection, lack of diversified services and feedback mechanisms, etc.

Table 11: Challenges of data visualization

Games Index	Policy standard ecology	Organizational strategy execution	Innovative application absorption	User-friendly design
Data Visualization	*A lack of stakeholder demand survey policy *A lack of prevention mechanism for some users to illegally use visual data.	*The visual data type is rough and simple, and the use steps of the platform are cumbersome, so the interconnection between platforms cannot be realized.	*There is a lack of innovation in viewing methods, and cooperation with enterprises to create more intelligent visualization methods has not been realized.	*Customized personalized user services are not yet available.

Both the Shanghai Municipal Transportation Commission and the Shanghai Public Data Open Platform are open to the public and support registration and real-name authentication. The authentication method is also relatively convenient. And they have detailed introductions and other instructions on the homepage. The websites also provide a simple model and a suitable model for the elderly, as well as a reading mode for text files. In terms of viewing specific data, the website of the Shanghai Public Data Open Platform has already managed to provide a list of "Information Disclosure Catalog" and an "Open Data Annual Report" chart. The "Convenience Query" section of the Shanghai Municipal Transportation Commission and the "Shanghai Public Data Open Platform" database provide services such as

classification query, Eexcel/Cvs table download, etc. In addition, users can also view the data map, annual keywords maps, annual reports, annual plans, and other information.

However, they still have some visualization challenges. First of all, clicking on the data you want requires a jump to several other platforms which is cumbersome. Secondly, at present, the government controls the data and the standards for governing, and the overall presentation of the data is too official. Besides, there are no open personal data service settings, such as no personal data service of collection, subscription, or preference tracking. In this regard, Jie's (2019) research conducted a questionnaire survey on three types of users about their experience in using Shanghai's open data website (including 115 enterprises, 64 citizens, and 37 non-profit organizations). The survey results show that the residents classified all the factors of personalization into the expectation factor (the interaction between the platform and the user, such as evaluation, error correction, response, etc.), that is to say, the user regards the government's provision of personalized services as an expectation rather than a necessary factor.

To summarize, in this chapter, we explore the challenges that Shanghai has faced in the five games of public data governance. While these concerns are fairly obvious, the underlying causes of these issues will be discussed in the following chapter.

6. Discussion

In this chapter, we will have a deep discussion of the whole process of our research including restating our research motivation and research question, doing a thorough analysis of our research findings on the open data governance, and then giving some reflections.

Although the debate on smart cities is very established, there is still a void in the literature on smart transportation (Fan, 2019). The existing literature is based on the research from a western perspective (Tan og Chen, 2017), but discussion about open

data governance in China which has a relatively special political background will be a novel topic for exploration. Based on this research motivation, we found out that currently the studies on open data governance in Shanghai are mainly focused on technology (Zhu og Fang, 2021), there is a lack of exploration from the governance perspective and this is the research gap in this field. Therefore, our paper aims to clarify the governance aspects of open data development in smart mobility in Shanghai. In particular, our research questions are: *How does open data governance play out in the field of smart mobility in Shanghai, and what are the main challenges?* After the empirical research on open data platforms in smart mobility of Shanghai by using the datapolis theory and the social system theory, we research the present situation and the existing problems in smart mobility, then discuss the complexity of the political challenge under the background of China and the potential reasons.

6.1 Result analysis

In the last chapter, we summarized the problems and challenges of Shanghai open data governance in smart mobility based on social system theory, then sorted them into four types according to the datapolis theory. Here we organize them in a more refined way.

Table 12: Research finding

	Balancing different perceptions of urban problems	Guaranteeing checks and balances in access to urban information	Building upon different forms of knowing in urban decision-making
Findings based on Datapolis	*A lack of stakeholder demand survey policy *A lack of personal privacy protection policy *A lack of stakeholder demand feedback function *A lack of customized and personalized demand services	*Data collection right, ownership right, use right, supervision right and interpretation right are centralized and there is a lack of regulations and publicity	*A lack of cooperation and participation mechanism of stakeholders *A lack of the construction of open data discussion platform by stakeholders
Eessential reasons	*The construction of the Shanghai open data platform in smart mobility is still in its early stage. *Shanghai's unique political background and political participation mechanism. *Stakeholders involved in open data management lack intrinsic drives for value co-creation.		

In the datapolis theory (Meijer, 2018), the first challenge (Balancing different perceptions of urban problems) of smart city governance is to balance different views

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on urban issues when balancing the needs, to realize multi-form democracy. The second challenge (Guaranteeing checks and balances in access to urban information) is to ensure the check and balance of information access in the distribution of power, to create a balance of power among various groups in the city. The third challenge (Building upon different forms of knowing in urban decision-making) is that decision-making and implementation are not only on a quantitative and reasonable basis but also on the knowledge of different stakeholders.

Based on this understanding, we discuss the specific manifestations of these problems in Shanghai and analyze the potential causes in combination with China's political background, and the technical background of open data platforms.

6.1.1 Balancing different perceptions of urban problems

In terms of this challenge, according to the open data laws and policies and relevant documents issued by the Shanghai transportation department, all the five governance games lack the policy-making process of demand survey. Especially in terms of the protection law of the right to privacy, research on the legal path of government data opening puts forward that the absolute privatization of personal information is contrary to the public interest under the government data opening (Qiu, 2021). The government pays too much attention to the public interest while ignoring privacy protection. Furthermore, the existing demand survey is one-way in terms of stakeholder demand feedback. Citizens and businesses may not engage seriously if the government does not issue documentation allowing them to participate in the consultation, especially if the issues are not of interest to them. Or they take the initiative to complain or provide feedback, but the government does not act on their thoughts and does not publicize them.

The Shanghai open data platform has been operational since November 2018, and the development of open data governance has been slow. It specifically lacks a grasp of user needs and individualized services for different user types, and feedback systems

to address those needs. Fan (2019) and Walravens et al. (2016) emphasized the need for the government to have a structural and iterative dialogue with different stakeholders and formulate policies based on different backgrounds in terms of attitudes, bottlenecks, expectations, and requirements for open data. However, in the above discussion, we can see that there is a serious lack of such dialogue before the government makes a policy in Shanghai.

We believe that the main reason for this challenge may be the Chinese special political and legal background which emphasizes too much on the concentration and concealment of public data. This is explained in official data storage documents: "administrative organs shall not construct special business networks; those that have been constructed shall be classified and merged into the city's e-government network" (Shanghai Municipal Peoples Government, 2020). According to scholar Tang (2021), the survey on the cognition of open data shows that the respondents have insufficient cognition of the concept of value co-creation, but they are aware of the significance and value of utilization of government open data. Some respondents, especially government staff worry sensitive data will be leaked or improperly used, there is the idea of "doing more and making more mistakes, doing less and making fewer mistakes" (Fan, 2019).

Therefore, we believe that the governance of the needs of stakeholders is not only related to the active restrictions (cultural awareness) and passive restrictions (political technology) at the government level, but also related to the political participation attitude of citizens and other stakeholders.

6.1.2 Guaranteeing checks and balances in access to urban information

Fan (2019) proposed that to remove the data related to national security and personal privacy, the transportation governance of all institutions and departments must be decentralized to open the data. These departments include the Ministry of communications of the people's Republic of China, the public security department,

the maritime bureau, the aviation bureau, as well as bus companies, taxi companies, etc. However, as we can see from the structure chart of the open data governance organization (Figure 3), the right to use, supervise and explain the platform is all within the government. In this highly centralized platform management function, the independent governance right of the transportation department is not high. This centralized right cause a certain degree of efficiency problems in the use of public data. For example, in the process of data storage, the multi-level internal management of the government leads to the disadvantages of low data transmission efficiency and lack of timeliness. In addition, in terms of the distribution of rights, the Shanghai transportation government department still lacks relevant norms.

When considering the reasons behind this, we believe that the Chinese government has strong security concerns at the political level, as evidenced by the very limited number of open data governance documents. This point can also be seen in the empirical study of Hong Kong, China carried out by Ma og Lam (2019) which ranks barriers to open data governance in terms of law and licensing, technology and operations, level of use, institutions, governance, and economics. The result shows the lack of accounting policies for open data is the main problem. Therefore we consider that the challenge also lies in the political system and national macro ideology, which is a fundamental challenge for the reform of open data platform governance in practice.

6.1.3 Building upon different forms of knowing in urban decision-making

Although the Shanghai administration has certain avenues for absorbing social experience, final decisions are still primarily dependent on quantitative data. Furthermore, the five governance games lack the expertise and engagement of various stakeholders. There is, in particular, a lack of public debate forms for scientific research institutes and social groupings. Gupta et al. (2020) believe that the core of urban data is to reduce the friction of data sharing between entities and re-balance the industry narrative of government technology around open data. In a real data

ecosystem, openness, fragmentation, and shared vision are the three barriers. In fact, the Shanghai Municipal Transportation Commission has already made some efforts in this direction. For example, there is a "Shanghai big data joint innovation laboratory" project which is open to universities and transportation departments and is committed to cooperating to explore the development of smart mobility. However, the degree of this participation is not deep, and the government has not opened more channels to enhance the contact with enterprises and public and private. Some data technology companies want to participate in the update of data storage technology but they have no chance.

In addition, at present, Shanghai's open data governance still lacks the construction of an open data discussion platform, especially for marginalized groups such as the elderly, the disabled, women, and low-income groups. Data blind spots often make the government less aware of their needs and contributions. Therefore, these blind spots must be overcome, which is why the government and society are required to have continuous dialogue to know each other. Usually, the best way is to let marginalized groups participate in the process of open data governance (Fan, 2019).

Considering the above situation, we believe that the reason for this challenge may not only come from the government itself. After all, the Shanghai government has consciously wanted to promote the cooperation of stakeholders in society but citizens' awareness of public governance participation is quite low. Bhattacherjee (2012) also mentioned that western society pays more attention to individual rights. In contrast, Asian societies tend to strike a balance between individual rights and family, organizational and government rights, so they tend to be more public and less individualistic in their policy. we can see that the low awareness of participation in public governance is a traditional habit of Shanghai citizen which also make the governance process very difficult to involve them.

Chen og Jian (2020) divided the government data open public participation model based on the ladder theory of public participation into informed participation,

consultative participation, cooperative participation, and authorized participation. Among them, the informed participation model focuses on conveying the open information of government data to the public. The consultative participation model focuses on the government consulting the relevant opinions and suggestions of the public. The cooperative model emphasizes the establishment of an equal cooperative relationship between the government and the public, and the authorized participation model highlights the independent exercise of rights by the public, so as to realize the common governance between the government and the public. We believe that the current open data platform governance in Shanghai is only in the stage of informed participation and consultative participation which needs a long time to get to cooperative participation.

6.2 Essential reasons

Furthermore, based on the development status and challenges of the Shanghai smart mobility open data governance, we try to explore the essential reasons behind these challenges.

The first is that the development of open data governance in the field of smart mobility in Shanghai is still in its infancy. Referring to Zhu og Fang (2021), used the technology system theory to evaluate the governance status of Shanghai's open data platforms in their research and the result showed that Shanghai's current data quality score is 81.36, and there is still a lot of room for improvement. The deficiencies are embodied in the low degree of data visualization, the low efficiency of the user feedback mechanism, the low internal interoperability of the platform, the penetration of data storage and collection channels, and the lack of openness. According to official documents and information from the Shanghai Municipal Transportation Commission, Shanghai is currently investing a lot of resources in the technical construction of an open data platform, but the construction foundation is still poor due to the early stage, so the challenges mentioned above are unavoidable.

The second is Shanghai's unique political background and political participation

mechanism. Based on Fan's (2019) research and analysis of China's open data platform for smart mobility, there are two common contradictions in open data governance in Chinese cities. First, the Chinese government wants to improve the openness of data governance, but there are concerns about national security leaks and other political risks. Second, other stakeholders have increased public governance capacity and potential demand, but channels for participation are scarce.

Finally, there is a lack of intrinsic drive for value co-creation among all stakeholders involved in open data governance. Tang (2020: p.23) proposed that value co-creation of open government data refers to taking value realization as the internal driving force, taking the government and multiple stakeholders as a closely integrated whole, co-creation is achieved through multi-participation and consultation and cooperation. Furthermore, the scholar discovered that stakeholders lack awareness, needs, and motivation for value co-creation in data governance in China which are consistent with our research findings in Shanghai.

6.3 Reflections

Our research investigates the challenges of open data governance in the field of smart mobility in Shanghai by using the empirical method of case analysis. We discuss an important topic in smart cities: "smart mobility, which is a critical system without which the smart city cannot be sustainable" (Surdonja et al., 2020: p.604). After reading the relevant literature, we discovered that data is an important tool in promoting a more "smarter" form of mobility (Townsend, 2013) and that there are two types of data: "open data" and "big data" (Eekhoff et al., 2015), with open data being a primary step in involving all stakeholders in the construction of smart mobility (Ji, 2019). And open data differs from big data in that it is less dependent on technology, but it requires more governance than big data. However, there is currently very little research on open data governance, particularly in China. As a result, we chose open data in smart mobility for more in-depth research from a public governance standpoint, as proposed by Meijer (2018). Under the guidance of this theory, we investigate the (previously mentioned) challenges of Shanghai's open data

governance in smart mobility, as well as the reasons for these challenges. As a result, we believe our research adds to existing research on smart mobility and open data, particularly the lack of Chinese elements in open data governance.

7. Conclusion

This thesis presents the findings of a qualitative investigation into open data governance in Shanghai. It provides an empirical illustration of how open data governance is being implemented in smart mobility in Shanghai, as well as the challenges that have been encountered. Using ideas from datapolis theory (Meijer, 2018) and social system theory (Zhu og Fang, 2021), the thesis addresses the following questions: *How does open data governance unfold in the field of smart mobility in Shanghai and what are the main challenges on its way?*

After conducting research, we conclude that Shanghai's open data governance in the field of smart mobility is not perfect. The government imposes far too many constraints, making it difficult to balance the needs of various stakeholders and it is also too centralized, making it difficult to balance the distribution of rights, and the governance thinking is too rigid, making it difficult to absorb innovative ideas from other social groups. The emergence of these issues has created significant barriers for the government to further improve governance and the solution to these problems has become critical. However, we discovered that relying on the government to change the governance method is insufficient to address these challenges because these challenges are accompanied by issues such as a lack of relevant knowledge among the general public, a lack of participation awareness, and a lack of market orientation. All of these issues reflect the fundamental issue, which is that the stakeholders involved in open data governance have not formed a good cooperative relationship, and the various groups are too independent and have not achieved value co-creation.

As a result, this topic paper contributes to the literature in a variety of ways. To begin, it responds to a recent call for smart city construction by discussing smart mobility, one of the most important topics in smart city construction. And now there is a lack of

literature dedicated to smart mobility (Fan, 2019), whereas our research is specifically dedicated to smart mobility, and we conducted empirical research on Shanghai using the case study method, so we believe our research can supplement the lack of research in this field and provide a case reference. Furthermore, most existing research on open data is technical (de Mooij, 2013; Molis,2019, Alexander,2020; Aifadopoulou,2018; etc.), with little research from a governance perspective. We investigated the current state and challenges of open data governance in Shanghai from the standpoint of public governance by using the datapolis theory (Meijer, 2018). In terms of the research perspective, we believe that our research fills a research gap in open data governance to some extent.

However, the thesis has several limitations that provide opportunities for further research. First, this thesis is limited to a single case and qualitative data findings. More empirical examples should be discovered in future research. Second, in terms of research theory, the datapolis theory (Meijer, 2018) and social system theory (Zhu og Fang, 2021) we used also have limitations in that they cannot address all of the issues surrounding open data governance, such as explaining specific technical issues which will also impact the governance process. And in terms of research methods, because our research is based on interpretivism, there is some subjectivity in both the description of the phenomenon and the data analysis designed during the research process. As a result, in the following research, we will investigate additional theories that can support our research, recognize the complementarity of the various theories, and avoid limitations caused by theoretical flaws. Finally, our research is carried out mainly from the perspective of the government, but not all the stakeholders involved in data governance like enterprises and citizens. Therefore, in our next research step, we may begin with a new perspective, such as citizen or enterprise participation, and base our research on subjective factors such as data governance willingness to analyze its impact on Shanghai's open data governance.

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Appendix

Platforms	Source
Shanghai Municipal Transportation Commission webiste	http://jtw.sh.gov.cn/
Shanghai Public Open Data Platform webiste	https://data.sh.gov.cn/
All-in-one Netcom APP （一网通随身办）	Apple Store China