MASTER'S THESIS

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External pressures and internal dynamics of the implementation of MaaS：

Case study of Shanghai City Government

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Preface

This master's thesis marks the end of our master's degree at Nord University. We have the honor to conduct research on the implementation of MaaS in Shanghai with the curriculum set by this project.

Throughout the whole research process, we first would like to thank our supervisor, Evgenii Aleksandrov. He would read what we write very carefully and give his constructive comments. With his encouragement and help, we not only successfully completed the writing of the thesis, but also obtained the logic of research different from China. Next, we would like to thank the EduSmart project: Education and Knowledge Development for Smart City Governance and Performance Management in the High North (Funded by Research Council of Norway, 2021-2024) for our financial support to help us better develop our research. Finally, we would like to thank other teachers from Nord University and East China Normal University for providing the opportunity to study in Norway.

During this experience, we learned knowledge, found true love, and prepared for the future academic career. We will never forget our time in Bodø.

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Abstract

Mobility as a Service (MaaS) is a new concept of smart mobility, and current research focus on its concepts, prospects and challenges. However, little research has been conducted from the administrative perspective of the municipalities that play a central role in the MaaS development. Our master's thesis sheds light on the relationship between specific government contexts and MaaS implementations. Specifically, our research questions are: Why does the city government implement MaaS? How is the MaaS concept being implemented in specific city government context? To answer these questions, we use institutional isomorphism and institutional logic as theoretical guides. We then applied document analysis to explore the external pressures and internal dynamics of MaaS implementation in Shanghai government.

Through data collection and analysis, we have found that the implementation of MaaS in Shanghai is first under pressure from the higher government. Secondly, in order to solve the traffic problem and achieve the goal of becoming a world-class city, the Shanghai municipal government implemented MaaS after imitating cities at home and abroad. It is worth noting that in the Chinese context, the pilot system is also a reason. The practice process reflects the mixture of the three governance logic, which to some extent shows the diversified characteristics of China in the period of deepening market-oriented reform. In particular, the MaaS implementation in Shanghai has been largely influenced by the NPM Logic, while the NPG Logic is showing increasing value, and the TPA Logic still plays a fundamental role.

Our work makes the following contributions. Firstly, we study the MaaS implementation in a specific political and social context, using Shanghai as an example. Secondly, our study examines the government's approach to MaaS implementation, thus providing a new perspective for understanding the smart transformation and sustainable development of Chinese cities.

Keywords: Mobility as a Service, Isomorphism, Institutional logic, Shanghai

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1.Introduction

With the development and changes of people's lifestyles, smart transportation is facing new demands and challenges while smart mobility offers new solutions in such a process (Bıyık et al., 2021). In addition, smart mobility plays an important role in promoting sustainable development. Because smart mobility solves traffic congestion, reduces the use of private cars, and thus contributes to pollution abatement (Butler et al., 2020). However, at the governance level, the existing governance model cannot adapt to the new demands in the field of mobility (Jittapirom et al., 2017). It means that people's demand for transportation is constantly escalating, from the basic need for "owning transportation" in the past to the quality needs of time, environment, transfer, services, and other aspects (Bıyık et al., 2021). These changes have led to the birth of a new concept in the mobile field called "Mobility as a Service"(MaaS).

MaaS is to integrate various forms of transportation services into a single travel complex that can be accessed on demand (MaaS Alliance, 2017). There have been many studies that focused on the prospects and challenges of MaaS. Many scholars have affirmed the prospects of MaaS in the field of sustainable development (Jang et al., 2021; Pangbourne et al., 2018; Zawieska & Pieriegud, 2018). For example, Jang et al. (2021) believe that MaaS can increase the frequency of consumer use of public transportation, reduce consumer demand for private cars, and improve sustainable transportation. MaaS can also transform individual mobility from fragmentation to polycentricity, thus improving public benefits (Hensher, 2020)

However, the implementation of MaaS also faces various challenges. There are some important research directions in this field, such as, conflicts between stakeholders, user acceptance and preferences, etc. Strömberg et al. (2018) pointed out that there are contradictions in the goals and values of the public and private sectors during the implementation of MaaS. This has led to difficulties in maintaining a balance in the regulation of MaaS (Kamagini et al., 2016) and a lack of trust in data flow (Alyavina

et al., 2022). In addition, some studies have shown significant differences in the needs of different types of MaaS users (Johansson, 2017; Matyas & Kamargianni, 2019; Melis et al., 2018; Sochor et al., 2018). There are potential conflicts of interest between different user groups (Melis et al., 2018). In terms of user preferences, Alyavina et al. (2022) believes that MaaS cannot effectively reduce users' dependence on vehicles as it is difficult to change their travel habits. In addition, the increase in travel costs brought about by MaaS may reduce users' affordability (Pangbourne et al., 2018; Alyavina et al., 2022).

Compared to the research that focuses on the prospects and challenges of MaaS mentioned above, only a few studies emphasize the specific background of the implementation of the MaaS concept and point out the importance of adapting to local conditions for MaaS implementation, including existing routines of city government (Butler et al., 2021). In that sense, while the previous studies stress that public sector in general and local/city governments in particular play important role in MaaS development, the understanding of their motivations and internal rationales remain somewhat limited.

Due to the aforementioned research gap, this thesis aims to elucidate the relationship between specific government contexts and MaaS implementation. We chose Shanghai as the case study because its MaaS development is leading in China but still strong role of the state in such initiative. Moreover, due to Shanghai's tremendous achievements in open data, we can fully access government public materials. In addition, there is limited literature on MaaS research in Shanghai and its government tradition in relation to MaaS. And there is not much literature to answer the question about how the influence of specific context will have when it comes to the MaaS implementation, including its causes, external pressures, and the comprehensive impact of internal governance logic. Therefore, we believe that this case study is worthwhile and interesting. Based on this, our main research questions: *Why does the city government implement MaaS? How is the MaaS concept being implemented in*

specific city government context?

We use Institutional Isomorphism (Meyer & Rowan, 1977; DiMaggio & Powell , 1983) and Institutional Logic (Thornton et al., 2012; Ostrom, 1990; Hughes, 2017; Massey, 1993) as theories we applied in this research. We first use institutional isomorphism to understand the external reasons for the implementation of MaaS in Shanghai. In order to analyze the internal governance logic of MaaS implemented by the Shanghai municipal government, we introduce three institutional logic: traditional public administration, new public management and new public governance. As data sources, we selected official documents and reliable media reports on the Internet. In terms of research methods, we mainly depend on qualitative analysis with minor combination of quantitative one. Based on the theoretical framework and in consideration that the study involves case study of Shanghai , we collected relevant evidence in these documents to answer the research questions.

The rest of thesis is organized as follows. The second chapter is the literature review of Mobility as a Service (MaaS). The third chapter describes the theoretical framework used in this thesis and the forth chapter presents the research philosophy and illustrates the methodological choices on which this study is constructed, as well as the methodological tools that have been used during the research. The fifth chapter introduces the empirical findings. The chapter six contains the analysis and discussion of the findings in relation to literature review and theoretical framework. Chapter seven reviews this thesis，also illustrates the contributions of the master thesis, as well as suggestions for further research.

2. Literature review

In this literature review section, we first review smart mobility and emphasize the necessity of MaaS. Secondly, we make a literature review on MaaS. In this part, we elaborate the definition and core elements of MaaS, and then organize the research on the functions and prospects of MaaS. Next, we summarize the challenges faced by

MaaS from the perspectives of stakeholders, users, and specific contexts. In the process we discovered the importance of context-specific implementation of MaaS and current research limitations. Therefore, we conclude by discussing research gaps and raising our research questions ones more time.

2.1 Smart mobility

With economic development and social progress, urban development has entered a new stage. Environment protection, social welfare, regional development and population mobility have triggered new challenges faced by various cities (Bıyık et al., 2021). In this context, urban development needs to find a new model, which is the practical basis for the concept of smart city. Some scholars have defined the framework of smart cities from different perspectives. Conceptually, smart cities are all urban settlements that consciously and strategically utilize new information and communication technologies (ICT) to achieve prosperity, efficiency and competitiveness at multiple socioeconomic levels (Angelidou, 2014). In terms of system, smart city is embodied by realizing the six core systems of the city - human social network, government control of business, transportation, communication, water and energy smart development (Dirks & Keeling, 2009).

In these systems, urban mobility is an instrumental element connecting different systems of the city (Bıyık et al., 2021). Giffinger et al. (2007) believe that smart city system is an integrated system with accessibility, safety and sustainability characteristics. Munhoz (2020) believes that the main purpose of smart mobility is to create a sustainable, safe and accessible environment to meet the traffic needs of citizens. Therefore, the future-oriented traffic model needs to deal with the needs from four aspects: mobility service, operation and control, road and vehicle networking, and infrastructure intelligence (Bıyık et al., 2021). This means that the smart mobility service can promote the development of smart transportation and is also a key indicator of it. In the context of sustainable development, smart mobility has a

significant role in reducing environmental pollution. Smart mobility improves vehicle efficiency by solving the problems of traffic flow and congestion, and also promotes the development of sustainable transportation. These help to optimize the structure of energy consumption, thereby reducing greenhouse gas emissions (Butler et al.,2020). It also increases the accessibility of public transportation in rural and suburban areas. This can reduce the use of private cars to reduce traffic congestion and has a positive impact on urbanization (Pangbourne et al., 2018).

Therefore, the demand in the field of smart mobility services is attracting social and government attention. This not only needs to deal with new requirements from the technical level, but also needs to solve new problems from the business and governance levels (Bıyık et al., 2021). At the technical level, digital and smart technologies are increasingly applied to the field of mobility, and the status of data in mobility service continues to rise (Zhong & Wang, 2022). In terms of how to bridge the gap between data management and traffic scenarios, Zhong and Wang (2022) argue that stakeholders in the smart mobility domain can form good partnerships in open data governance through value co-creation. Moreover, Bellotti et al. (2015) argue that integrating traffic data into applications can provide more possibilities for users to get around.

At the governance level, the original governance model cannot adapt to the new demand from the mobility field (Jittrapirom et al., 2017). People's demand for mobility has been constantly upgraded, from the basic demand of "having transportation tools to use" in the past to the quality demand of travel time, environment, transfer, service and other aspects (Bıyık et al., 2021). The changes in technology and society have led to the birth of a new concept in the field of mobility. This new concept needs to solve the problem of the lack of an effective docking platform between the demander and the supplier in the traditional mode, and to meet different needs through an interface, so as to achieve the goal of the entire transportation department to become a cooperative and interconnected ecosystem

(Jittrapirom et al.,2017). Thus, a new concept in the field of smart mobility-"Mobility as a Service" came into being.

2.2 Mobility as a Service

This section consists of the following parts. First, we examine the literature on the definition and core elements of MaaS. Second, we describe the functions and promises of MaaS. Third, we sort out the current literature that analyzes the challenges of MaaS from a critical perspective. Finally, we discuss the existing research gaps and raise our research questions.

2.2.1 Definition and core elements

At the European Union ITS Conference in 2014, the President of the Finnish Intelligent Transport Association, Sampo Hitanin, took the lead in putting forward the concept of "mobility as a service" (MaaS). He believes that MaaS is a new mobility service model that can meet the mobility service needs of travelers, and this model is met through the interface provided by service providers (Hietanen, 2014). In 2015, the European MaaS Alliance was established which is the first regional MaaS union. In the white paper released in 2017, the MaaS Alliance proposed the widely accepted definition of MaaS: Mobility as a service (MaaS) is to integrate various forms of transportation services into a single travel service that can be accessed on demand (MaaS Alliance, 2017). This white paper also lays the foundation and provides some guidelines for the MaaS ecosystem.

The definition of MaaS is still evolving. Mark et al. (2018) believes that MaaS is a multi-modal transport platform that must include different transport modes, and the needs and preferences of each user are also considered by the MaaS platform (AI4CITIES., 2020). Smith and Hensher (2020) hold the opinion that MaaS is a medium to access services including information search, reservation, payment and planning, rather than the sum of them. Therefore, MaaS can be understood as a service type that enables users to plan, subscribe and pay for multiple types of mobile

services through joint digital channels.

In addition to the definition of MaaS, many scholars have discussed the main characteristics of MaaS (Alyavina et al., 2022;Liu et al., 2022). Alyavina et al. (2022) summarize these ideas into eight core elements of MaaS, namely: Consolidated Transport Offering, Access via Digital Platform, Inter-modal Journey Planning, Bundles of Services, Payment Options, Decision-making Support, Inclusion of Extra Services, Multi-Stakeholder Cooperation. The details of these elements are shown in Table 1. Alternatively, Liu et al. (2022) believe that MaaS system should include five core elements, including: a single service platform, multiple travel modes covering public and private transport, real-time query of multi-mode travel information, customized travel packages, integration of multi-mode travel path planning and payment methods. Despite some variations in core elements of MaaS, there is growing acknowledgement of its value for the cities that we present below.

Table 1 Core elements of MaaS

Elements of MaaS	Description
Consolidated Transport Offering	Integrate conventional public transport services with commercial shared use mobility alternatives
Access via Digital Platform	Access multiple transport modes through an all-in-one digital platform based on App or Web
Inter-modal Journey Planning	Enable users to use the same platform to realize functions such as journey booking, ticketing, payment and access to real-time information
Bundles of Services	Combine different transport modes according to the actual needs of users

Payment Options	Support a pay-as-you-go basis as well as the form of a periodic subscription
Decision-making Support	Promote active or environmentally friendly travel through informational campaigns and financial incentives
Inclusion of Extra Services	Include additional services provided by other suppliers
Multi-Stakeholder Cooperation	Build the cooperation of multiple stakeholders

Source: Alyavina et al. (2022)

2.2.2 Promises of MaaS

Regarding the role of Maas in regional governance, many scholars have emphasized the relationship between MaaS and sustainable development (Jang et al., 2021; Pangbourne et al., 2018; Zawieska & Pieriegud, 2018; Smith & Hensher, 2020). These literature mainly discuss the promises of MaaS from the perspectives of urban governance, carbon footprint, and reducing private cars.

Jang et al. (2021) thought MaaS can improve sustainable transportation systems. Because the bundles of services provided by MaaS will reduce consumer demand for private cars, or even delay and eventually stop car purchases, thus improving sustainable transportation. Pangbourne et al. (2018) proposed an analysis of MaaS to assess its potential impact on urban decision makers in terms of governance and sustainability. They emphasizes that MaaS is not a fixed commodity, but a conceptual way to provide services to customers. Zawieska and Pieriegud (2018) analyzed the relationship between the deployment of the smart city concept and the concept of sustainable mobility. The authors also analyzed the impact of carbon dioxide released by smart city components as a determinant of mobility. The United Nations "ForFITS (Future Inland Transport System)" model has been used to predict the possible carbon

dioxide emissions from the implementation of urban transport systems. Its results show that in order to achieve the emission reduction goal, the transportation and energy fields must be completely changed. In addition to the relationship with sustainability, Smith and Hensher (2020) believed that the development and diffusion of MaaS could be conceptualized as an attempt to transform the personal mobility system from fragmentation to polycentricity, with the aim of obtaining public benefits by changing the fragmentation.

Yet, despite the promises of the MaaS mentioned above, the growing body of research also demonstrate challenges of its implementation in different contexts.

2.2.3 Challenges of MaaS

There is a growing discussion of challenges related to MaaS implementation. These challenges are reflected in interdisciplinary literature, including transport, public administration, urban studies and cities research (König et al., 2016; Yang & You, 2019; Polydoropoulou et al., 2020; Smith et al., 2019; Russ & Tausz, 2015; Strömberg et al., 2018; Kamagiani et al., 2016; Johnson et al., 2017; Dybtsyna et al., 2020; Kamagiani & Matyas, 2017; Wong et al., 2020; Smith et al, 2018; Johansson, 2017; Matyas & Kamargianni, 2018; Melis et al., 2018; Sochor et al., 2018; Alyavina et al., 2022). Several important research directions were identified in previous studies.

Firstly, much research has investigated the cooperation of different actors within MaaS implementation and related challenges (König et al., 2016; Yang & You, 2019; Polydoropoulou et al., 2020; Smith et al., 2019; Russ & Tausz, 2015; Strömberg et al., 2018; Kamagiani et al., 2016; Smith et al., 2018; Alyavina et al.,2022). König et al. (2016) believed that the business model of MaaS can be divided into four levels, namely: Public Level and the Regulatory Level, Transport Logistics Service Provider Level (i.e. supply side), Mobile Service Level (mainly as MaaS operator), End User Level. Because government often has a social focus, it has a leading influence on public transport operators (as backbone), and may realize MaaS through various

policies and incentives. In addition, the traditional public-private partnership (PPP) is regarded as the basic business model in the MaaS field because the implementation of smart solutions in the transportation field usually requires large-scale investment and excellent management skills, which are often the deficiencies of the public sector. And these deficiencies of the public sector form the practical basis for the public-private partnership model (Yang & You, 2019). Some scholars also believe that in addition to promoting the cooperation among transport operators, governments and private enterprises, as well as the relationship among private enterprises should also be emphasized (Polydoropoulou et al., 2020). There are also opinions that the public sector needs to ensure the participation of users in the MaaS implementation (Smith et al., 2019), because users' acceptance of MaaS and their opinions play a key role in the final effect, which also shows that the traditional model of public-private cooperation can also be transformed into a partnership involving multiple participants (Russ & Tausz, 2015).

However, there are also some challenges about cooperation among the different actors in MaaS. There are contradictions between the public sector and the private sector in the pursuit of goals and values, which urges the MaaS sector to find new business models. The public sector aims to achieve social benefits, and emphasizes reducing environmental pollution and improving travel experience, while the private enterprises aim to maximize their income (Strömberg et al., 2018). In addition, too much regulation will dampen the enthusiasm and innovation performance of private enterprises, while too little regulation may damage the interests of stakeholders and have a negative impact on the project results (Kamagiani et al., 2016). Moreover, in the process of public-private partnership, the suppliers of public transportation may not get enough brand recognition because of the need to supply the brands through the MaaS platform, making it difficult to be fully controlled by suppliers and work with data flow (Smith et al., 2018). In addition, a lack of trust will make private providers reluctant to share their traffic data (Alyavina et al., 2022).

Secondly, much research was also devoted to acceptance and preferences of user in MaaS. Some scholars have studied from the perspective of user demand classification (Johansson, 2017; Matyas & Kamargianni, 2018; Melis et al., 2018). This demand difference constitutes a potential conflict of interest for MaaS, which indicates that it is necessary to design MaaS system and identify and classify different user groups from the perspective of user needs (Melis et al., 2018). Sochor et al. (2018) shows that male, high-income groups and families with children have lower acceptance of the MaaS system, while low-income groups, groups without cars, groups without children and environmentalists have higher acceptance of the MaaS system. Some studies also show the impact of price factors and usage habits on user choice. If the cost of using MaaS is competitive with other alternatives, the young user group is more inclined to use MaaS (Johansson, 2017). Yet, Alyavina et al. (2022) believe that the potential of MaaS to reduce the vehicle dependence of users is quite limited. This is mainly because some drivers have trouble changing their travel habits. And, as MaaS increases mobility accessibility, this can lead to additional travel, putting pressure on the mobility system. Moreover, Polydoropoulou et al. (2020) believes that the shift to MaaS may lead to the creation of monopolies, which may lead to MaaS operators to increase service prices. Service prices are up, but users' ability to pay remains unchanged, which will have a negative impact on the overall transportation affordability (Alyavina et al., 2022).

Thirdly, in terms of application program design, the MaaS program is the product presentation form of smart mobility on the user side. This product reflects the "one-stop" service and integration features of the smart mobility platform. The current MaaS products can provide many services, including route planning, navigation, reservation, fee payment and other functions, and more functions are being added to the application to meet the needs of users (Stopka, 2020). However, this makes the MaaS become highly dependent on mobile devices. Some marginalized groups in digital technology, such as the elderly, those who have not previously been exposed to mobile technology, or those disabled who have difficulty using their mobile phones,

may be excluded (Jittrapirom et al.,2020).

Therefore, based on the overview of the literature, we see that MaaS becomes a growing trend around the globe with many promises to deliver with regards to sustainable urban mobility. At present, from a global perspective, the Europe is the region where the concept of mobility as a service has been practiced the most in reality (Butler et al., 2020). Yet, MaaS is being received more and more attention both from academics and policymakers in the rest of the world, including China. It has become a hot topic in the field of smart transportation (Li et al., 2018). In this regard, the current research on MaaS pays much attention to the concept definition, function, and the impact on sustainable development (Hietanen, 2014; MaaS Alliance, 2017; Mark et al., 2018; AI4CITIES., 2020; Smith & Hensher, 2020; Arias-Molinares & García-Palomares, 2020; Jittrapirom, 2017; Mulley et al., 2018;Wong et al., 2020). In addition, growing number of studies has explored the challenges of the MaaS implementation such as aspects of PPPs cooperation, users acceptance and preferences (Johansson, 2017; Matyas & Kamargianni, 2018; Melis et al., 2018; Sochor et al., 2018). Yet, still only few studies emphasize the specific context of the implementation of the MaaS concept with the acknowledging that “not all size fits all” (Butler et al., 2020). Moreover, most of the studies focused on implementation processes and content of MaaS from position of users and business perspective with less focus on reasons behind implementation on MaaS by the city governments and how they do it from governance tradition in the public sector.

This prompted us to think about the intentions of the city governments to promote the MaaS and how the implementation of MaaS concept will be influenced on a specific city government context. To address this research gap, we main to explore the implementation of MaaS in the specific context of Shanghai. Specifically, our research questions are:

RQ1:Why the city government implement MaaS?

RQ2:How is the MaaS concept being implemented in specific city government

context?

In order to answer these questions, we apply ideas from institutional isomorphism (DiMaggio & Powell, 1983) and institutional logic (Thornson et al., 2012). These theories are valuable since they move our attention from previously revealed in the literature rational aspects of MaaS implementation and its content to more cultural and institutional aspects. In particular, institutional isomorphism becomes valuable to reveal external pressures and reasons to adopt MaaS by city governments. Institutional logic, in its turn, becomes valuable to reveal internal dynamics in implementation of MaaS and values attached to the concept from exiting city government traditions. We reflect more on these theories below.

3.Theoretical framework

In this chapter, we will introduce Institutional Isomorphism and Institutional logic as theories we applied in this research. Then, we will make the reflection on how we apply those theories to our research questions.

3.1 Institutional Isomorphism

As the core theory of the new institutionalism of organizational sociology, the theory of institutional isomorphism is based on Marx Weber's study of bureaucracy. In his argument, Weber gave the name "iron cage" to the expression of the rational spirit of capitalism in the field of organization (Weber, 2002). Since Weber makes the argument that there is a direct connection between the social values and the formal structure of the organization, his view already contains the implication that the organizational system will eventually converge. After that, with the development of organizational practice and related theories, the discussion on whether institutional isomorphism pursues efficiency or legitimacy has gradually become a key issue in the field of organizational development (Steinmo, 2001).

Since the 1960s, the emergence of the rational choice (Rational choice institutionalism) and the sociology of organization (Sociological institutionalism)

have given an explanation for this issue respectively (Hall & Taylor, 1996). "Rational choice institutionalism" is based on the assumption of rational economic man, which is largely influenced by the theory of rational choice. It believes that in the context of competition, the purpose of institutional isomorphism is for the organization to realize the pursuit of the utility maximization through institutions (Knight & Sened, 1998). "Sociological institutionalism" believes that in the institutional environment, the purpose of institutional isomorphism is to pursue legitimacy. Because the system can create meaningful ways for the individual, the actor will follow the institutional rules and norms, because other types of behavior are unacceptable and not recognized (Scott, 2013).

In this theoretical context, Meyer and Rowan (1977) start from the question of why various organizations have such similar structures. From the perspective of the new institutional system: they believe that the formal organizational structure is created in a highly institutionalized context. And the institutional rules have a "mythological function" (p.352), which can give organizations access to legitimacy, resources, and stability. Thereby it increases the possibility of tissue survival. Organizations thus have to absorb the popular rational ideas of organizational operation and the procedures defined by the institutionalization of society. Even if the direct effect of learned practices and procedures is to damage efficiency (Meyer & Rowan, 1977). Later, DiMaggio and Powell (1983) put forward the most representative theory of organizational isomorphism: they analyzed the logical origin of organizational convergence. Three mechanisms leading to organization convergence are proposed: coercive mechanism, mimetic mechanism and normative mechanism.

①Coercive isomorphism

According to DiMaggio and Powell (1983), coercive isomorphism arises from the formal and informal pressures by other organizations which they depend, and from the cultural expectations of the society in which they operate. This process of isomorphism is also influenced by governmental behavior and organizational scaling,

as organizational structures evolve to increasingly reflect the state and the rules of institutionalization and legitimation within the state in a context where the state and other rational organizations exert greater dominance over social life (Meyer & Rowan, 1977). Coercive isomorphism takes both direct and indirect forms: the direct form of coercive isomorphism generally comes from formal pressure from the government, which shapes the institutional environment by issuing decrees that force organizations to accept the system in question, while the indirect form of coercive isomorphism is reflected in the fact that organizations must comply with certain regulations in order to obtain the resources they need (Beckert, 2010). Power-induced isomorphism is not only inevitable when "more powerful societies demand that organizational forms be emulated" (Westney, 2013), but is also the result of more subtle and indirect processes (DiMaggio & Powell, 1983).

Thus, as DiMaggio and Powell (1983) elaborate, coercive isomorphism stems from pressures that are viewed by organizations as forces for action, which include governmental directives, budget cycles, financial reporting requirements, and regulatory agencies.

For the field of MaaS, coercive isomorphism may be expressed in two forms, which are direct and indirect, therefore explaining institutional aspects of MaaS adoption by municipal governments. The former comes from the strategies and specific decrees on traffic development promulgated by higher authorities or other government sectors, while the latter means that the person in charge must abide by the relevant regulations on the implementation of MaaS in order to obtain resources or achieve goals.

②Mimetic isomorphism

Mimetic isomorphism refers to organizations imitating the behaviors and practices of successful organizations in the same field. There are three main motivations for organizations to imitate: lack of understanding of technology, ambiguity in goal setting, and uncertainty arising from the environment (March et al., 1979). When faced with uncertainty, organizations tend to adopt the solutions used by other organizations in the same organizational field when faced with similar uncertainty, with the aim of reducing the risks associated with uncertainty by imitating successful

organizations (DiMaggio & Powell, 1983). The adoption of imitation strategies by organizations is also related to their quest for legitimacy and public recognition. When organizations believe that the correct course of action is unclear, they may imitate the behavior of other seemingly legitimate organizations (Mizruchi & Fein, 1999).

Moreover, mimetic isomorphism is also related to the laws of economic development, as Kimberly (1979) points out that throughout the economy, new organizations are modeled after old ones, and managers actively seek out models that are already established and proven to work. This practice produces two results (DiMaggio & Powell, 1983), on the one hand, despite the considerable exploration of diversity by organizations, there are relatively few new approaches to choose from out of a need to succeed. On the other hand, imitation has significant advantages in terms of human and capital investment. That is to say, when an organization is faced with a problem whose cause is unclear or whose solution is not easy to come up with by itself, this organization may mimic others. This strategy often costs very little yet provides the organization with a realistic and feasible solution.

In the field of mobility, we can understand the adoption of MaaS as part of influence of mimetic isomorphism in several ways. Namely, that is when the person in charge of the transportation department is uncertain about the goals of future, or has no clear solution to the current problems, the person in charge may tend to imitate the feasible solutions of other regions or organizations. In other words, the responsible person may imitate MaaS already implemented in other regions or countries to solve the traffic problems in the region, because this can effectively reduce risks and investment costs.

③Normative isomorphism

DiMaggio and Powell (1983) define normative pressure as the result of specialization in a particular organizational field, characterized by the collective struggle of professional members to define their working conditions and methods, to control the "production of producers", and to establish a cognitive basis and legitimacy for their professional autonomy. Meyer and Rowan (1977) express the view that social

processes have a rule-like status in thought and behavior. Those professionals who are nurtured and trained under certain educational models and career development programs will, through their interactions with each other, develop a hierarchy of status similar to center-periphery, which will this become a matrix for the flow of information and people between organizations (DiMaggio & Powell ,1983).

In conclusion, normative isomorphism emphasizes that cognitive communities contribute to the formation of shared ideas in interaction based on a common cognitive base and worldview, which leads to institutional convergence in institutional design. Cognitive communities may come from different contexts, but they share four important common contexts: shared principle beliefs, shared causal beliefs, shared notions of validity, and shared policy orientations (Tian, 2018).

As an emerging field in modern society, smart transportation has higher professional requirements for information technology and urban planning. This requires decision makers to have a common educational background, professional norms and technical standards. On the other hand, these norms and standards guide decision-makers to think and act in a similar way, such as implementing MaaS related policies. In other words, the normative isomorphism in context of MaaS would suggest that reasons for MaaS implementation will be related to professional development and competence building within city government.

Thus, based on these three different mechanisms of isomorphism, we will be able to understand the external reasons behind MaaS implementation in the specific context of Shanghai. DiMaggio and Powell (1983) analyzed the theory of organizational convergence from three different mechanisms of the relationship between the organization and the environment, which helps us understand why China's transportation sector adopts the concept of MaaS as the latest strategy in the field of travel services. Specifically, we want to use the theory of institutional isomorphism to study whether and what kind of pressure is applied to the implementation of MaaS projects in Shanghai. Yet, while reflecting to the question why, isomorphism is limited in giving the understanding of more internal dynamics in MaaS implementation. In

this regard, the section that follows reflects on institutional logic perspective when analyzing MaaS implementation.

3.2 Institutional logic in city government as three administrative paradigms

Institutional logic "represent frames of reference that condition actors' choices for sense-making, the vocabulary they use to motivate action, and their sense of self and identity" (Thornton et al., 2012, p. 2). That is to say, the perspective of institutional logic is a meta theoretical framework used to analyze the interrelationships between institutions, individuals, and organizations in social systems. It can help us understand how organizational actors are affected by their situations in multiple social environments. Applying to the case of cities governments and implementation of MaaS in particular, there will be multiple logic influencing on internal dynamics of MaaS construction (Lounsbury, 2008). In other words, when studying MaaS implementation from city government perspective, it becomes essential to understand the values and logic that is attached by city officials to the concept of MaaS. Based on the previos studies within public administration and management (Hyndman & Lapsley, 2014; Timoshenko & Khodachek, 2017; Fred, 2020), there are three sets of institutional logic that will be a part of city governments, namely: traditional public administration, new public management and new public governance. These three institutional logic description and presentation are closely related to what is called administrative paradigms.

Since Woodrow Wilson published his book *Administrative Studies* in 1887, public administration has been developed as an independent research field for more than 100 years. And the administrative paradigms have also undergone multiple changes (Cheng, 2021). Some scholars have proposed different classification methods for the paradigms of public administration (Ostrom, 1990; Hughes, 2017; Massey, 1993). Ostrom (1990) divides public administration into two paradigms: bureaucratic administration theory and democratic administration theory: the former is based on the theories of Wilson and Weber, and is characterized by centralized power and bureaucratic administrative systems; the latter is based on the ideas of Hamilton, Madison and Tocqueville, and is characterized by a decentralized and democratic administrative system. Owen Hughes (2017) divides the paradigm of public

administration into traditional public administration and new public management, according to the principle of logical construction: traditional administration is influenced by the theories proposed by Weber, Wilson and Taylor, while new public management is mainly based on economic theory and private sector management theory. Massey (1993) believes that public management theory exists at least three theoretical paradigms, namely traditional public administration theory, new public management theory and public governance theory. He points out that these three theories of public administration evolved with the problems in the operation of the real society and the changes of social value orientation on the basis of traditional public administration concepts.

By further comparison, we can find the difference between these paradigms. Ostrom's analysis of the theoretical paradigm of public administration has certain limitations, because the administrative system is a part of the research field of public administration, and this discipline is more involved in the relationship among the government, the market and the society (Wu & Liu, 2014). Therefore, Ostrom's classification method for the theoretical paradigm of public administration is not enough to reflect the overall picture of the theoretical evolution in this field. While Hughes' dichotomy for the theoretical paradigm of public administration meets the criteria of paradigm change, but he does not fully take into account those new theories who are criticizing the old paradigm (Wu & Liu, 2014).

In contrast, Massey's definition of the paradigm of public administration theory is more comprehensive. The traditional public administration theory clarifies the research object, research content and research methods in the field of public administration, while the new public management theory puts forward a return to the market and come up with new governance methods that take into account both fairness and efficiency. While the new public governance theory, on the basis of perfecting the new public management theory, breaks the limitation of "government-centered" and emphasizes the diversification of participants and the pursuit of democratic values (Cheng, 2021).

① Traditional Public Administration

Traditional public administration theory was born in the era of the collapse of traditional society and the rise of modern capitalist society after the Industrial Revolution. During this period, economic development changed from free competition to monopoly, and the development of productive forces also caused problems including political corruption and low administrative efficiency. Therefore, the purpose of government efficiency and administrative management became an urgent issue (Zhao, 2018).

The traditional public administration theory is based on Wilson's "political-admi nistrative dichotomy", Max Weber's "bureaucracy" theory and Taylor's scientific management theory (Dunleavy & Hood, 1994).

First of all, Wilson is not only the first scholar to lay the foundation of the professional field of public administration, but also the scholar who has made the basic theoretical construction of traditional public administration by proposing the concept of "political-administrative dichotomy". Wilson believes that administration and politics are two concepts with different natures: politics is the state's activities in major and general matters, while administration is the state's activities in particular and small matters. Therefore, politics is the expression of the will of the state, emphasizing democratic values such as fairness, representation, and responsiveness, while administration is the execution of the will of the state, and its highest value or greatest good is efficiency (Stillman, 1973).

Secondly, Max Weber’s bureaucracy theory has shaped the classic model of traditional public administration organization structure and explained the efficiency logically(Zhao,2018).Weber's bureaucracy theory believes that an ideal administrative organization should have a strict hierarchical management similar to a pyramid, which is characterized by bureaucracy and efficiency maximization. Because bureaucracy theory can overcome the problem of low organizational efficiency, it is considered by traditional public administration to be the most effective tool to achieve executive efficiency.

Finally, Taylor's scientific management theory provides methodological inspiration for the operation of bureaucratic government (Stillman, 1973). Taylor pointed out that

wealth can be maximized only when the productivity of workers and machines in the enterprise is maximized. That is maximization of wealth can only be the result of maximization of productivity (Taylor, 2004). Taylor's proposition that efficiency is the core value of management is very consistent with the process and habits of hierarchical government operations under the bureaucratic system, so it has become one of the basic principles of public administration.

Therefore, the traditional public administration theory paradigm mainly has the following characteristics: Firstly, adhere to the principle of political-administrative dichotomy. Secondly, the value orientation dominated by efficiency. Thirdly, bureaucracy and scientific management are the best way to achieve administrative efficiency. In addition, due to the admiration of Weber and Taylor's ideas by traditional public administration theory, this paradigm is largely value-neutral and efficient. Public administration often focuses on administrative organization, administrative system, administrative behavior, etc., but basically does not consider metaphysical issues such as administrative ethics and administrative philosophy (Wu & Lin, 2014).

② New Public Management

In the 1970s, the emergence of the civil rights movement and economic stagnation led to a crisis of government management and trust. However, the bureaucratic government under the guidance of the original traditional public administration logic could hardly meet the increasingly diverse needs and has difficulties in solving social problems. So the reform movement of public administration emerged (Dunleavy & Hood, 1994).

As pointed out by Hughes (2017), during this period, the traditional administrative model based on the bureaucratic system and political-administrative dichotomy has become obsolete and has been replaced by a new public management model based on economics and private sector management. New public management represents the change of the administrative paradigm from the bureaucratic model to the market-oriented model, and also means the transformation of the relationship between the market and the government, the government and citizens, and the relationship

between bureaucratic organizations and citizens.

The new public management logic is an all-round reform of the traditional public administration paradigm. This logic recognizes the assumption in the new institutional economics that the government is a "limited government" that is restricted in terms of functions, modes of operation, and areas of functioning. On the basis, by emphasizing that the market mechanism is superior to the government mechanism in essence, it is proposed to provide reform services through the market to improve the supply efficiency of public services with the help of competition mechanism (Cheng, 2021). The core point of view of the new public management logic is just as advocated by two scholars, Oxborne and Gaebler (1995), that is, to introduce advanced enterprise management experience into government, and to establish modern economics (new institutional economics) and private enterprise management. And then apply the enterprise management methods such as target management and performance management to the construction process of government management and administrative system. There are three main propositions of the new public management logic.

Firstly, the elements of new public management include professional management, emphasis on clear standards and measurement methods of performance, emphasis on the efficiency of resource use, and the introduction of competition mechanisms in the public sector (Hood, 1991). Secondly, using the market mechanism or quasi-market mechanism to provide government services. Government services need to decentralize power in terms of organization and management while the public sector should improve service quality and focus on customer needs (Pollitt, 1998). Thirdly, the new public management should be a good management approach that is more strategic and results-oriented than the old public administration approach. At the same time, the government under this logic has consistency in power and responsibility, and the public sector needs to establish an effective budget and management system (Holmes & Shand, 1995).

Therefore, the new public management paradigm mainly has the following characteristics: first, the definition of the concept of limited government; second, the emphasis on the role of the market mechanism in government management; third, the

promotion of the "enterprise" operation of the government; fourth , taking "Three E" as the value orientation, that is, Economy, Efficiency and Effectiveness. During this period, the research on public administration was no longer limited to the government itself, and paid more attention to the interaction among the government, the market, and society. (Wu & Lin, 2014).

③ New Public Governance

Since the 1990s, the concept of "governance" began to appear in Western countries and has become a striking concept of public management in the 21st century. The emergence of new public governance paradigm is mainly to solve the defects of previous paradigms. Traditional public administration emphasizes the governance of public affairs through the bureaucratic system, while new public management prefers market and enterprise mechanisms. However, the practice of public management has repeatedly proved that no matter whether it is the government or the market, it is difficult for any single subject to achieve effective governance of public affairs. (Zhao, 2018). In addition, after the new public management logic was put forward, social forces, as the third sector besides the market and the government, also played an increasingly important role by making up for the failure of the government and the market. The development of civil society and the rise of non-profit organizations mean that social forces participating in the governance process of public affairs will be a trend in the development of public management.

As Stoker (1999) pointed out, the so-called public governance "refers to the realization and promotion of public interests, government departments and non-governmental departments (private sector, third sector or individual citizens) and other public management subjects cooperate with each other , the process of sharing public power and jointly managing public affairs in an interdependent environment.

In this context, the basic content of new public governance paradigm mainly has three aspects: First, it emphasizes the diversification of governance subjects. Governance

subjects participating in public affairs have increased from markets and governments to complex subjects including public welfare organizations, communities, and individuals; secondly, all actors participating in governance have equal status and have interdependent relationships. In new public governance logic, the relationship between different subjects has changed from a hierarchical structure to a grid structure. In this new structure, although the government plays an important role, the government is not necessarily the most critical actor, which also breaks the original "centre-periphery" structure that emphasized the role of the government. Finally, the way of governance among different subjects is mainly through consultation. In the governance network, although formal mandatory regulations are not excluded, more moderate governance methods including negotiation and compromise have a more important position (Osborne, 2006).

Therefore, the new public governance logic can be regarded as a transcendence of the dichotomies of administration-management, government-market and equality-efficiency emphasized by traditional public administration logic and new management logic. As Osborne (2006) said, in a pluralistic society, the new public governance emphasizing pluralistic participation helps people break out of the bottleneck of the original public management paradigm and find a new management path that meets the needs of the current society.

Summing up, we then use these three institutional logic to analyze the specific ways in which the Shanghai municipal government implements the MaaS project. That is, because governance logic is the basic principle that governments rely on when carrying out all activities, we can analyze the governance logic held by MaaS operators in Shanghai through the analysis of discourse expression, value proposition, and goal setting. And then find out the specific way of implementing MaaS in Shanghai based on these logical characteristics. In order to illustrate the basic content of the above three institutional logic more intuitively and the relationship between these logic and the implementation of MaaS in Shanghai, we have made the following

reflection table 2 and 3.

Table 2 Key ideas of different institutional logic in the implementation of MaaS

Elements	**Traditional Public Administration**	**New Public Management**	**New Public Governance**
Governance philosophy	The government is the planner and implementer of MaaS based on principles of bureaucracy and rule of law, hierarchical organizational structure where all documents, norms and standards create legitimacy between government levels	More emphasis on the allocation role of the market to MaaS, more about managerial aspects and business orientation in services, decentralized organizational structure with focus PPS and legitimacy by means of performance and profits generation	The government is part of the multi-subject of the MaaS project and open to involve all stakeholders into decision-making, cooperative organizational structure with involving citizens and creating legitimacy to all stakeholders
Role of government	Key role in controlling MaaS development and its direction	Less role, more steering the direction of MaaS and outsourcing it for business development	Distributed role opening dialogue with stakeholder on MaaS development
Public participation and role of citizen	No explicit public engagement MaaS, citizen is ruled	Participate selectively in MaaS as a consumer, citizen as consumer	Actively engage with MaaS, citizen is a stakeholder and decision-maker
Emphasis and values in MaaS development	Provide institutional guarantee for traffic travel and traffic facilities with a focus on formal procedures for MaaS policy implementation	Marketization or privatization to reduce unnecessary government intervention in the field of travel for traffic efficiency and profitability for business	Provide public travel services and contribute to society and diverse demands of different groups, including citizens
Assessment of MaaS development	Formal assessment based on bureaucratic rules and budgets/inputs	Evaluation of economic benefits and output of MaaS	Multiple dimensions of evaluation of MaaS for different stakeholders, including citizens

Table 3 Keywords/Codes of different institutional logic in the implementation of MaaS

	Traditional Public Administration	New Public Management	New Public Governance
Keywords /Codes	Government-led Resident Rules/Specifications/Policies/Laws Obey Admin/Leader Execute / Executor Departments at all levels Objectivity System guarantee Procedure Concentrated Function	Management/Supervision Efficiency Results (output/result) Satisfaction Customer/user/consumer Strategic Planning Measures/Indicators/Targets Objective Resource/value Contract Quality/suitability Cost Performance	Governance Transparency External responsibility Stakeholders Mesh Cooperate Diverse Sustainable Ethics Fair Public participation Democracy Negotiation

		Audit Flexibility Decentralization Responsible/duty Public Affairs Market Corporatization/Agency Competition/Tendering/Privat-ization Economic benefits	Civil Society/Non-Profit/Thi-rd Party Sector Accountability Public Service Travel needs Public Interest Social benefits

4.Research methodology

In this chapter, we have three sections. The first part reflects our research philosophy and research paradigms, and we chose induction research approach. The second part is about the MaaS in Shanghai as our case. We then designed the data collection and analysis methods. The last section discusses the reliability and validity of the study methodology, and the reflection on limitations.

4.1 Research philosophy

The choice and specific application of research methods actually show the researchers' worldview, and also reflect their ideological understanding of the selected research topic (Krauss, 2005). The choice of research methods involves the philosophical thinking of researchers as individuals about their research tasks. Generally speaking, before conducting specific research, researchers need to establish a research paradigm for their research content from the cognitive dimension and the value dimension. This research paradigm includes not only the fact judgment of the researcher on the research object, but also the value judgment of the researcher on the basis of practice and consciousness. That is to say, on the one hand, researchers' choice of research methods actually reflects their understanding of research philosophy as well as their response to the way they use to observe and evaluate the world (Antwi & Hamza, 2015). On the other hand, the choices made by the researchers based on their worldview will react to the researcher's understanding of reality and perception of the world through the research process and research conclusions (Krauss, 2005).

Therefore, the research philosophy is decisive for the research results, as the researcher's

values and perception of reality are closely related to epistemology and ontology (Creswell, J. W. & Creswell, J. D. 2018).

4.1.1 Ontology

Ontology focuses on the essence of reality and the understanding of the world's operating mechanism and laws. Under the framework of ontology, there are two kinds of research logic: Objectivism, which describes the realistic position of social entities outside the social actors related to their existence. Subjectivism, which believes that social phenomena are concerned about the essence of reality by those who pay attention to their existential ontology (Saunders et al., 2009). Ontology is mainly concerned with the relationship between entities existing in society and actors participating in social activities. In the field of social science, Saunders et al. (2009) think there are four specific philosophical positions: realism, internal realism, relativism and nominalism.

4.1.2 Epistemology

Epistemology focuses on the factors that constitute knowledge that can be widely accepted in a certain field. Epistemology focuses on how people acquire knowledge about the real world and the society as material (Saunders et al., 2009). Epistemology emphasizes the investigation of the origin, limitation, validity and possibility of knowledge (Krauss, 2005). This paradigm advocates the judgment of the authenticity of phenomena, the determination of knowledge acquisition process, and the judgment of truth and fiction. Therefore, epistemology discusses which knowledge can be recognized and has practical significance, that is to say, epistemology has the characteristics of value judgment. Researchers take their values as the basis for conducting research and establishing specific research methods.

4.2 Research paradigms

As discussed by Saunders et al. (2009), the ideology held by researchers will affect their choice of research philosophy. That is to say, when we are going to conduct research on an event or phenomenon in the field of social science, we must examine the philosophical paradigm on a theoretical basis, so as to evaluate, understand and explain the research object.

In their book *Sociological Paradigms and Organisational Analysis*, Burrell and Morgan (2017) proposed a quadrant matrix of research paradigms, namely functionalism, interpretivism, radical humanism, and radical structuralism. They argue that these four research paradigms represent four theoretical models and ways of working that researchers subscribe to, as well as four different ways researchers view the social and organizational world.

Firstly, the functionalist paradigm involves rational explanation and a series of management theories and models including business process remodeling. Researchers employing this paradigm to support the view that organizations are rational entities, so that rational explanations can provide solutions to rational problems (Kelemen & Rumens, 2008). Research under the functionalist paradigm is often based on the philosophy of positivism, with the aim of making recommendations for improvement through the evaluation of the effectiveness of organizations and events, also known as "positivism-functionalism" (Burrell & Morgan, 2017).

Secondly, the interpretivism paradigm focuses on the way that humans understand the world we live in. Researchers who hold this view start from understanding the basic connotations of organizations and social life. Burrell and Morgan (2017) argue that the purpose of interpretivism is not to propose ways to change the status quo, but to attempt to provide a way of understanding what is happening through theorized narratives and engagement with everyday activities.

Thirdly, the radical structuralist paradigm is primarily based on the analysis of organizational phenomena, and then explores ways to achieve fundamental change. Researchers who hold this paradigm tend to identify with the philosophy of critical realism, and they intend to make changes to the original order by making claims about how organizational affairs should develop and change. The radical structuralist paradigm adopts an objectivist perspective, focusing on the realization of fundamental psychological changes based on the analysis of organizational phenomena such as power relations and conflict patterns (Burrell & Morgan, 2017).

Finally, the radical humanist paradigm adopts a critical perspective on organizational life. It emphasizes both its political nature and the consequences of one person's words and actions on others (Kelemen & Rumens 2008). Researchers who hold this

paradigm will also focus on issues that they feel require urgent change, such as power, politics, and governance. However, the humanistic tendency of this paradigm determines that researchers tend to analyze problems from a subjective and ontological perspective, just as Burrell and Morgan (2017) believed, researchers will emphasize social construction, language, process, and organization. And researchers also put emphasis on the importance of instability of structure and meaning in reality.

The subject of our research is the application status of MaaS in the specific context of Shanghai, which is a social phenomenon that is constantly receiving attention in the field of transportation. In our empirical research, we do not attempt to fundamentally change or propose a new development model for the way of MaaS implementation in Shanghai, but to conduct a subjective review of the current status of this field in Shanghai. Therefore, we advocate the use of interpretivism paradigms to aid practice. At the same time, we believe that the concept of MaaS is increasingly becoming a thing with dual attributes of physical products and virtual services. Therefore, through the collection and processing of information, the conclusion with explanatory power is obtained by induction is in line with our research purpose.

4.3 Research approaches

According to our research philosophy and paradigm, we need to determine that we use inductive as research approach before starting research design. Saunders et al. (2009) holds that the deductive method is obtaining specific statements or individual conclusions from the general premise. While induction is a research approach that summarizes the general principles of the individual facts obtained from observation, experiment and investigation. When there is not much relevant literature on a new research topic, it is more appropriate to generalize by collecting data than to make a hypothesis and test a conclusion (Creswell, 2012). Our research question is how the MaaS concept is translated in a specific context. Through Shanghai as a case study to observe and collect data, and inductive analysis, will be more reasonable. Therefore, the research approach that we choose is the induction.

4.4 Research design

According to Saunders et al. (2009)'s opinion, research design consists of research

purpose, research strategy, analysis method and data collection. The details of research design are as follows.

4.4.1 Research purpose

Our aim was to examine why Shanghai adopted the MaaS concept. Moreover, we want to further discuss how the specific government context influences the MaaS concept, which can also be called "how the MaaS concept is applied in Shanghai government".

4.4.2 Research strategy——Shanghai as a case study

In terms of the history, the concept of MaaS was first born in Europe. It was proposed by Hietanen in 2014 and became a concept that attracted attention at the 2015 International ITS Conference. The first MaaS Academic Salon held by the China ITS Association in 2018 marked the official emergence of this concept in China (Chen et al., 2021).

When it comes to the concept definition, there is no essential difference between Europe and China in the elements of the concept of travel and service. Both sides are acknowledging that MaaS, as a new model integrating different modes of transportation, will have a significant impact on users' travel choices. This concept of mobility focuses on services rather than modes (Long et al, 2019).

But in specific practice, there are differences between Europe and China. Specifically, the practice of mobility as a service in Europe is characterized by diversification and decentralization. Different European countries have significant differences in the development stage, business model and practical experience of MaaS. At the same time, there is an exploratory pilot program in the European market. In China, however, the development of the concept of Mobility as a Service is mainly guided by the national macro-policy, and it is an important measure of the government's reform in the transportation field (Chen et al., 2021). Thus, we can say the MaaS implementation in Europe is more sourced while it is more holistic in China.

The development of mobility in Shanghai is consistent with China's economic development process. Moreover, MaaS is currently a hot topic in the field of smart

mobility in Shanghai. In the 1990s, with the introduction of Australia's adaptive traffic signal control system as a sign, Shanghai began the initial attempt of smart city traffic construction (The White Paper for the Development of Shanghai Municipal Transportation 2022 Edition) . After entering the 21st century, the Shanghai Municipal Government has carried out a series of reforms in the field of mobility, and has successively launched the urban public transport card service, the comprehensive transport information platform, and the comprehensive transport information data platform with sharing and exchange functions. (The White Paper for the Development of Shanghai Municipal Transportation 2022 Edition). On October 10, 2022, the Shanghai MaaS platform "Suishenxing" App was launched. This application integrates public transport tools such as buses, subways and ferries, as well as mobility services such as one-touch call cars and smart city parking. The launch of the "Suishenxing" app marks that the Shanghai MaaS system officially provides services to the public (The White Paper for the Development of Shanghai Municipal Transportation 2022 Edition). The Shanghai Municipal Government believes that the "Suishenxing" APP is a mega-city MaaS platform led by the government and specially responsible for construction and operation. It not only reflects the public welfare of the government to serve the public, undertakes the operation of public transport data in Shanghai, but also actively participates in market competition (Xinhua News Agency, 2022).

Through the above, we find that the Shanghai Municipal Government and society currently pay high attention to MaaS, and a relatively complete public information can be found in the government website. Therefore, Shanghai as a MaaS case is an excellent choice.

4.4.3 Research choice——Qualitative analysis method

Social science research can be divided into two major categories: quantitative analysis and qualitative analysis. Qualitative research is a broad area of research that uses unstructured data collection methods such as observations, interviews, surveys, and documentation to explore themes and meanings to shape our understanding of the world. Quantitative studies usually take the form of data, illustrate social phenomena, foresee theories through deductive methods, and then evaluate or verify hypotheses by

collecting data and evidence (Creswell, J. W. & Creswell, J. D. 2018). According to our data type and analysis process, our research design selects the qualitative analysis method.

4.4.4 Data collection

In this process, our main data collection methods are the documents analysis method. Creswell, J. W. and Creswell, J. D. (2018) believe that the investigator may need to collect qualitative documents during the course of the study. These can be public documents (e. g., newspapers, meeting minutes, official reports) or private documents (such as personal diaries and diaries, letters, emails). For our research question, the documents we need to collect are government documents related to MaaS. In terms of government documents, the data we choose to collect are mainly on government work reports, guidance and materials from official news media. The main sources of these data are government websites, including: the State Council website (http://www.gov.cn/), Ministry of Transport website (https://www.mot.gov.cn/), Shanghai Municipal Transportation Commission website (https://jtw.sh.gov.cn/), Shanghai Municipal Government website (https://www.shanghai.gov.cn). Specifically, the documents is shown in Table 4 below:

Table 4:the Documents of MaaS in Shanghai

		Document/Newspaper
the State Council	1	Action Plan for Carbon Dioxide Peaking Before 2030
	2	The Program of Building National Strength in Transportation
	3	Guidance of the CPC Central Committee and the State Council for Carbon Dioxide Peaking and Carbon Neutrality in Complete,Accurate and Full Implementation of the New Development Philosophy
	4	Outline of the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and Vision 2035 of the People's Republic of China
Ministry of Transport	5	Key Tasks for the Shanghai's Pilot Project of Building National Strength in Transportation from the Ministry of Transport
	6	Guiding Opinions of the Ministry of Transport on Promoting the Construction of New Infrastructure in the Field of Transportation
	7	The 14th Five-Year Plan for the Development of Digital Transportation
	8	The 14th Five-Year Plan for the Development of Green Transportation
Shanghai	9	Implementation Plan for Carbon Dioxide Peaking of Shanghai

Municipal Government		Municipal Government
	10	The 14th Five-Year Plan for the Development of Comprehensive Transportation of Shanghai Municipal Government
	11	The 14th Five-Year Plan for the Comprehensive Promotion of Urban Digital Transformation of Shanghai Municipal Government
	12	Guidance of the Shanghai Municipal Government on the Comprehensive Promotion of Urban Digital Transformation
	13	The White Paper for the Development of Shanghai Municipal Transportation (2022 Edition)
	14	Several Policies and Measures of Shanghai Municipal Government for Promoting the Urban Digital Transformation
	15	Outline of the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and Vision 2035 of the Shanghai Municipal Government
Shanghai Municipal Transportation Commission	16	The Three-Year Action Plan (2020-2022) for the Promotion of New Infrastructure Construction in the Transportation Industry of Shanghai Municipality
	17	The Action Plan for Carbon Dioxide Peaking in Transportation Sector of Shanghai Municipality
	18	The 14th Five-Year Plan for the Development of Green Transportation of Shanghai Municipality
	19	The Implementation Opinions of Digital Transformation in the Transportation Industry of Shanghai Municipality (2021-2023)
Newspaper form Shanghai Municipal Transportation Commission	20	Shanghai MaaS system launched and many places explored integrated travel services
	21	State-owned enterprises in Shanghai promote the construction of MaaS "mobility as a service" system
	22	"Suishenxing" APP is here! You can take the bus, call a taxi, and find a parking space, and travel freely in Shanghai with "one QR-code"
	23	Jointly build the MaaS ecosystem with a one-stop green travel experience

Sources: the State Council, Ministry of Transport, Shanghai Municipal Government, Shanghai Municipal Transportation Commission.

Since there is not much content about MaaS in China before 2019, we compiled the main documents and media reports related to MaaS from the State Council, the Ministry of Transport, the Shanghai Municipal Government, and the Shanghai Municipal Transportation Commission from March 2019 to 2023 (See Table 4).

Below, we will discuss in detail the external pressure and internal governance logic that Shanghai received during the implementation of MaaS during this period.

4.4.5 Data analysis

In the process of data analysis, we first sorted out the collected government announcements, regulations and policies, news media reports. In the second step, guided by the three mechanisms of institutional isomorphism, we search for relevant evidence in the text analysis to answer the first question: *Why should Shanghai implement MaaS?* Then, we analyzed documents according to the core propositions and keywords of the three logic summarized in the theoretical framework section, including qualitative analysis of documents in relation to specific positions from table 1 (TPA, NPM or NPG) along with counting key words and frequencies in the documents based on table 2. We will make some tables to make the statistical results more clear and visualized. Therefore, we will use the three logic to systematically analyze what kind of logic dominates in the process of implementing MaaS in the context of Shanghai, or the combination of multiple logic. It is worth noting that we are not limited to these three logic. We should not ignore the unusual influence that the specific context of China and its government tradition may have on institutional logic (Khodachek & Timoshenko, 2017) and its influence on the implementation of MaaS.

4.5 Quality of research

Research quality refers to the researchers' research process and research results can be judged and tested by a set of logical concepts, that is, they can be evaluated by the two indicators of reliability and validity (Yin, 2018).

4.5.1 Reliability

The so-called reliability refers to the degree to which a specific research method produces consistent results. This logic is reflected in a specific study, which is the possibility of repeating the methods and processes mentioned in a study to obtain the

same results (Saunders et al., 2009). According to Yin (2018), the purpose of using reliability as a criterion for evaluating research quality is to minimize errors and ensure that research results are not the result of subjective bias of researchers, but objective results produced through research. For researchers, a common way to improve reliability is to increase the transparency of research and make necessary explanations for the data sources, collection and analysis methods used in the research process.

In this study, the use of case analysis method has a certain degree of subjectivity, because this research method is usually influenced by the researcher's personal experience and view of values. At the same time, the data used by the research mainly comes from official documents issued by the Shanghai Municipal Government. Other authoritative and public documents are also collected for cross-comparison to verify the reliability and consistency of our research. The reliability of this thesis comes from three aspects. Firstly, we have collected information from publicly available content on government websites and there are no barriers to their accessibility. Secondly, we have used a transparent research approach, and in the following sections we show the entire process of collecting, processing and analyzing the data and provide the necessary references. Finally, the thesis is co-authored by two authors who have carefully reviewed and cross-referenced the full text to reduce human error.

4.5.2 Validity

The so-called validity refers to the relationship between the research results and the description of the research content. Some potential problems in the research process will threaten the validity of the research, including history, ambiguity of causal direction, generalization, logical jumps, false assumptions, identification of the study population, data collection, data analysis and development of conclusions (Saunders et al., 2009). The validity of the research can be divided into internal validity and external validity. The former refers to the extent to which the description and analysis of the research results are in line with the facts, while the latter refers to the degree to which the research results can be generalized (Yin , 2018).

The main research content of this study is to study the implementation of MaaS in Shanghai, so it is more to explore the explanatory analysis of this research object,

rather than to propose a new research framework with replicability. Therefore, this study mainly focuses on how to solve the problem of internal validity. In order to solve this problem, we ensure the consistency of our research theories, research questions, research methods and research results by reading literature and consulting experts in related fields including supervisors.

4.6 Research ethics

Research ethics is the basic moral code that guides researchers to carry out their work. According to Easterby-Smith et al. (2015), as an institutional arrangement and principle that regulates research behavior, research ethics not only protects the interests of researchers themselves, but also plays the same role for other people and organizations involved in research. Therefore, taking research ethics as a protective measure is of great significance for researchers to complete a study.

According to the Norwegian National Research Ethics Committee in the Social Sciences and the Humanities (NESH), research ethics are tools to enable responsible organization and conduct of research. In 2021, this committee published the fifth edition of *the Guidelines for Research Ethics in the Social Sciences and Humanities*, and here it is necessary to briefly explain the principles and give specific ways in which we comply with the relevant ethics in the following paragraphs .The first part is about the research community and their collegial responsibilities. Researchers should act honestly, respect each other, and recognize each other's contributions in projects and publications. The second part is about the protection of human rights and the responsibilities of researchers to all research participants. Researchers have a responsibility to all those who take part in or are affected by research. Researchers should conduct research on the premise of obtaining the consent of the participants and ensuring the participants' right to know. The third section deals with groups and institutions, referring to vulnerable groups that may need additional protection. The fourth section concerns clients, funder, and partners, and researchers have corresponding obligations to different partners. Research ethics require researchers to

balance the norms of openness and independence with the needs of society for utility and relevance. The fifth part is about research dissemination, which refers to the responsibility of researchers and research institutions to disseminate the scientific results, methods and attitudes of their own and others' research to society as a whole.

The above-mentioned research ethics and the five basic principles established by NESH have been fully considered and used throughout the research process as the basic ethics guiding our research. Specifically, what we study is the analysis and interpretation of public sector actions, and in this process we mainly use government documents and media reports from publicly available sources. The content of these materials does not involve personal information, so there is no risk of personal data and privacy being compromised. At the same time, the materials we use come from open data on the Internet and open information on government department websites, and these contents exist in the form of public storage and public access. Therefore, the storage and archiving of data also meet the requirements of research ethics. We also make necessary references and explanations for the content used.

4.7 Method limitations

In our research, due to the limitation of research methods and research time, we have certain limitations. First of all, the qualitative research method we use has a certain degree of subjectivity, which means that our value judgments and concepts will have an impact on the way we observe and analyze problems. Secondly, the research materials we use are all from public channels, which means that the openness of the network and the sensitivity of the data will determine that some of the latest data may not be available. At the same time, due to the huge number of policy documents, we cannot guarantee that we can find and read every policy document carefully. Thirdly, the discursive expressions and value propositions in official documents have a fixed pattern, which means that what is expressed in these documents may only be a vague plan and proposition, which may change in the course of practice. Fourthly, some of

the materials we use involve plans for future development, which are predictable to a certain extent, and we cannot guarantee that future development will be consistent with the plans envisaged. Finally, during the course of our research, MaaS is still in the process of continuous development, and relevant documents and data are continuously updated. However, limited by the writing time of the thesis, we can only collect data before May 2023. Some new data and documents may be ignored by us, and further analysis and improvement are necessary.

5. Empirical findings

In this chapter, we will describe the results of our analysis of official documents and media reports. According to the research design, we collated the materials of relevant departments (State Council, Ministry of Transport, Shanghai Municipal Government, Shanghai Municipal Transportation Commission). Firstly, we make a brief introduction to the background of China's administrative system related to transportation. For subsequent analysis, we selected meaningful specific textual areas based on chapters covering MaaS related content. Being driven by our theoretical framework we then present first main findings present the external reasons for the implementation of MaaS by the Shanghai Municipal Government and the internal dynamics of the implementation of MaaS.

5.1 Government structure background

Overall, the main government departments related to the implementation of MaaS in Shanghai are the State Council, the Ministry of Transport, the Shanghai Municipal Government, and the Shanghai Municipal Transportation Commission. Their official documents provide a wealth of material for our research. Moreover, the affiliation and cooperation relationship between them also provides a certain basis for our result analysis. This part is mainly to help us understand the subordinate relationship in the framework of the Chinese governments. Only when we understand China's administrative system can we possibly understand why a document from one

department in China is mandatory for another, or is merely a suggestion. In order to show the relationship between government structures more clearly, we made Figure 1 as follows.

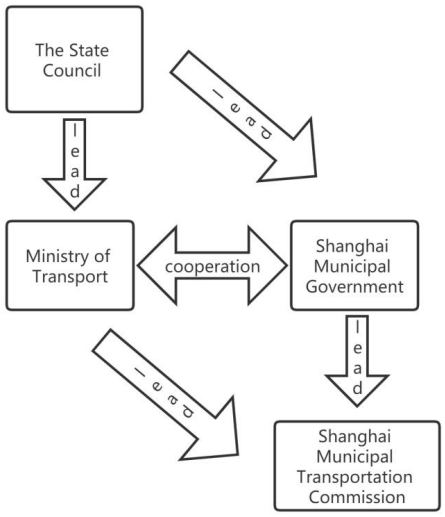

Figure 1 The Relationship Among the State Council, Ministry of Transport, Shanghai Municipal Government and Shanghai Municipal Transportation Commission

First of all, among the central administrative office, the State Council of the People's Republic of China is the central government of the country and the executive body of the highest state power. According to the "Constitution of the PRC", the functions and powers exercised by the State Council include: "making administrative regulations, issuing decisions and orders"; "Leading and managing urban and rural construction" and so on. This shows that the State Council can formulate and issue orders related to the implementation of MaaS, and lead other departments and local governments to work on MaaS.

There are different functional departments under the State Council. The Ministry of Transport is one of the functional departments of the State Council. It has the following responsibilities: "Responsible for organizing the formulation of comprehensive transportation development strategies and policies, organizing the formulation of comprehensive transportation system planning, and organizing the

drafting of comprehensive transportation laws and regulations" and so on. This shows that the Ministry of Transport can draft a system plan and related policies for the development of MaaS.

Among the local administrative authority, the Shanghai Municipal People's Government is the highest administrative authority in Shanghai, responsible and reporting to the Shanghai Municipal People's Congress and the State Council. The Shanghai Municipal People's Government has multiple functional departments, and the Shanghai Municipal Transportation Commission is one of them. This means that in Shanghai, the Shanghai Municipal Transportation Commission is the main functional department responsible for implementing MaaS.

Therefore, for four different organizations, the State Council, the Ministry of Transport, the Shanghai Municipal Government, and the Shanghai Municipal Transportation Commission, there are close and complex ties between them.

There is a central-local relationship between the State Council and the Shanghai Municipal Government. The State Council, as the central government, plays a leadership role for the Shanghai Municipal Government, while the Shanghai Municipal Government, as a local government, plays a specific implementation role. The State Council can guide and arrange the work of the Shanghai Municipal Government. As the highest administrative department in Shanghai, the Shanghai Municipal Government has a dominant position in public affairs in the region, and can also report various affairs at the local level to the State Council.

There is a bureaucratic relationship between the State Council and the Ministry of Transport. As a component department of the State Council, the Ministry of Transport accepts the leadership of the State Council and is responsible for implementing the orders and plans issued by the State Council in the field of transport. Under the institutional arrangement of the responsibility system to the prime minister, the Minister of Transport can submit opinions to the State Council. The relationship

between the Shanghai Municipal Government and the Shanghai Municipal Transportation Commission is similar to that between the State Council and the Ministry of Transport.

However, such a superior-subordinate leadership relationship does not exist between the Ministry of Transport and the Shanghai Municipal Government, and the sentences used by the two when they jointly sign documents or issue statements often include key words such as "negotiation", "cooperation", and "jointly" , indicating that the two are more of a cooperative relationship. It is worth noting that, although both the Ministry of Transport and the Shanghai Municipal Transportation Commission have their own higher-level government departments, in the professional field of transportation, the Ministry of Transport has the leading effect on the Shanghai Municipal Transportation Commission. This is because the implementation plan of the Shanghai Municipal Transportation Commission needs to be approved by the Ministry of Transport, and the work needs to be reported to the Ministry of Transport.

In addition, the State Council regularly issues macro plans. These plans involve various sectors of the national economy and social development, and play a role in guiding the development of Chinese society. However, they do not directly design specific plans for policy implementation, but only give abstract principles and strategic goals. The central functional departments and local governments formulate more specific implementation plans on this basis according to their responsibilities and actual conditions. This is of great help to our understanding of the pressure brought by the higher-level documents to the Shanghai government.

Thus, from the affiliation and functional arrangement between these four departments, we can see the uniqueness of the organizational structure of Chinese government . For a local government, it not only needs to comply with orders from higher-level departments, but also needs to maintain cooperative relationships with other departments at the same level. As the central government, the State Council plays a

leading role in leading government departments at all levels in China. The State Council not only plays a central role in the transportation sector under its jurisdiction, but also plays the same role in local governments in different regions of China. The professional departments in the transportation field established by local governments will be influenced by both the State Council and local governments during their operation. Such government structure makes interesting to investigate the reasons and internal dynamics of MaaS implementation that follows in the next chapter.

5.2 External reasons to implement MaaS in Shanghai

5.2.1 Coercive pressures as a part of authoritative relationships

The Shanghai Municipal Government's decision to implement MaaS was subject to both formal and informal pressure from the organizations it relied on. In the context of China, it is mainly the central government, that is, the State Council, supports the development of MaaS through direct authoritative relations such as promulgating regulations and policies. This authoritative pressure is often reflected in the continuity of policy formulation and document promulgation. Secondly, in order to fulfill the legal requirements of superiors and social expectations, and also to gain legitimacy for its own actions, the Shanghai Municipal Government has implemented a smart mobility development plan consistent with the central government. Since there is a superior-subordinate relationship between the Ministry of Transport and the Shanghai Municipal Transportation Commission, and between the Shanghai Municipal Government and the Shanghai Municipal Transportation Commission, the mapping between them is similar to that between the Shanghai Municipal Government and the State Council. Next, we will introduce two illustrative cases to show some typical evidence found in official documents (see Appendix 1).

The first evidence clearly demonstrates the coercion in the field of low-carbon environmental protection on the implementation of MaaS. In October 2021, the State Council put forward the "Action Plan for Carbon Dioxide Peaking Before 2030" and required *"the people's governments of all provinces, autonomous regions, and*

municipalities directly under the Central Government, all ministries and commissions of the State Council, and all institutions directly under the State Council...to implement it conscientiously." (first paragraph). The State Council put forward the "Green and Low-Carbon Action of Transportation" in the chapter of "Key Tasks" issued by the State Council. And in the specific requirements, the State Council proposes to *"develop smart transportation, create an efficient, fast and comfortable public transportation service system, and actively guide the public to choose green and low-carbon transportation methods."* (*Chapter 3,Article 5)*

In response to the policies of the central government, the Shanghai Municipal Government issued the "Implementation Plan for Carbon Dioxide Peaking of Shanghai Municipal Government" in July 2022. The first paragraph clearly states that this plan is to *"deeply implement the State Council's major strategic decision on carbon peaking" (first paragraph)*. This shows that the pressure from the State Council has forced the Shanghai government to take measures to meet the carbon peak target. In this document, the Shanghai Municipal Government also made arrangements for the specific work of its subordinate functional departments. In the chapter of "Green and Low Carbon Action for All", it proposed to meet the requirements of carbon peak carbon neutrality by realizing a green and low carbon lifestyle in all aspects of citizens' daily life, and designated the Shanghai Municipal Transportation Commission as one of the institutions responsible for specific implementation. In order to carry out these tasks, the Shanghai Municipal Transportation Commission released the "The Action Plan for Carbon Dioxide Peaking in Transportation Sector of Shanghai Municipality" in January 2023. In the first paragraph, it also clearly states that the implementation of this plan is *"in accordance with the requirements of the Shanghai Carbon Peak Implementation Plan... to develop this implementation plan."* In order to refine the policies of the higher-level departments, it further divides the green and low-carbon actions in transportation into 6 major sectors and 27 action tasks. The document clearly proposes the role of the MaaS platform in the green transformation of transportation:

".....Promote the construction of the Mobility as a Service (MaaS) system, enhance the smart service capabilities and travel experience of public transportation....." (Chapter 3,Article 2)

From this, we can understand that one of the reasons why the Shanghai Municipal Government implements MaaS is to achieve the unified carbon peak target of the national plan. Because the State Council has issued carbon peak target policies to all local administrative agencies. As a municipality directly under the central government, the Shanghai Municipal Government is under mandatory pressure to implement it. According to this policy, it is putting pressure on its various functional departments to achieve their carbon peak goals in their functional areas. As the department responsible for transportation in Shanghai, the Shanghai Municipal Transportation Commission has implemented MaaS to achieve this overall goal.

The second evidence that fully demonstrates coercion in the implementation of MaaS is in the field of infrastructure construction. In September 2019, the State Council proposed the "The Program of Building National Strength in Transportation" and requested that *"all regions and departments should conscientiously implement it based on actual conditions."* (*first paragraph*). The State Council proposed the development direction of "accelerating the development of new formats and models" and to *"vigorously develop shared transportation, create a service system based on mobile intelligent terminal technology, and achieve Mobility as a Service..."* (*Chapter 4,Article 2*)

Due to the documents issued by the State Council directly pointing out the planning arrangements in the field of transportation, the Ministry of Transport, as the competent department and also a subsidiary organization of the State Council, issued the "Guiding Opinions of the Ministry of Transport on Promoting the Construction of New Infrastructure in the Field of Transportation" in August 2020 as a response to the deployment of the State Council in the field of transportation. The Guiding Opinions

of the Ministry of Transport point out that the issuance of this document is *"to implement the decisions and deployments of the State Council, accelerate the construction of a strong transportation country..."* (*first paragraph*). In order to implement the deployment made by the State Council and the Ministry of Transport in the construction of integrated transportation, the Shanghai Municipal Transportation Commission released the "The Three-Year Action Plan (2020-2022) for the Promotion of New Infrastructure Construction in the Transportation Industry of Shanghai Municipality" in December 2020. In the first paragraph, it also clearly states that the implementation of this plan is "*to implement the work deployment of the Ministry of Transport... to assist in the construction of a strong transportation country*". In order to refine the policies of higher-level departments, it further divides the integration strategy of transportation into three aspects and twelve actions, including: *".....Real time and full aggregation of comprehensive transportation travel information, conduct research and promotion of the construction of the Mobility as a Service (MaaS) system....." (Chapter 3,Article 2)*

5.2.2 International imitation and national pilots as isomorphic developments

The development of smart mobility in Shanghai is facing some challenges. For example, switching between travel apps is cumbersome, parking is difficult, urban transportation capacity is insufficient, traffic congestion and public transportation routes are complex (Xinhuanet, 2022). In order to solve these problems, Mayor Gong investigated the traffic situation in Shanghai and proposed to adhere to the direction of Digital transformation of traffic sector. When the Shanghai Municipal Government has insufficient understanding of how to solve these problems, and when the goal of Digital transformation of transportation is too vague, it may imitate the practices of other organizations. Imitation behavior may lead to a feasible solution while reducing costs. Due to the influence of the surrounding environment, the Shanghai Municipal Government may imitate some popular solutions both domestically and internationally. Below, we will present some illustrative evidence found in official

documents and news media for such imitation patterns (see more in Appendix 2).

Firstly, at the international level, although there are currently no documents or official reports that clearly indicate which countries or regions have referenced solutions to solve travel difficulties, we can observe an imported product originating from the international environment in the documents related to digital transformation and transportation development planning. According to the main documents and media reports related to MaaS in Shanghai, the Shanghai Municipal Government has proposed that the future transportation development should reach the international first-class level. The common expressions in the documents are *"moving towards international first-class level", "comparing with the best international standards", "shaping the core competitiveness of cities", and "building an international city with global influence"*.

This implicitly indicates that under the background of fierce competition in the global digital field, the traffic development and digital transformation of Shanghai will be affected by the international environment. That is to say, in order to solve the existing transportation problems, the Shanghai Municipal Government clearly tends to imitate more successful solutions or standards that already exist internationally, specifically by implementing MaaS, which is currently more advanced abroad.

Secondly, the impact of China's domestic environment on the implementation of MaaS in Shanghai cannot be ignored. As stated in the official news article "Shanghai MaaS system launched and many places explored integrated travel services", prior to the launch of Shanghai's MaaS system, multiple places such as Beijing, Guangzhou, and Jinan had already conducted exploration of MaaS system applications. Especially after the launch of the MaaS platform "BWTON" in September 2020 in Beijing, which launched green travel carbon trading services, the Shanghai Municipal Government stated in the same news report that similar public welfare activities such as *"encouraging citizens to use green points"* will be launched in the future.This

indicates that Beijing's MaaS practice has provided certain reference significance for Shanghai. We can believe that the implementation of MaaS in Shanghai has to some extent imitated the successful experiences already existing in other cities in China.

It is worth noting that China's distinctive political system provides another interesting reason for the implementation of MaaS in Shanghai. In China's past economic and social construction processes, the central government has always tended to take advantage of international imitation in the own direction. That is, assigning specific cities or regions as pilot cities or regions to conduct experiments on emerging things, and then allowing other cities or regions to imitate the successful experiences and methods of pilot cities. This method is described in government documents as “from point to area”. Just as Shanghai imitates the MaaS function of Beijing in the previous text, the implementation of MaaS in Shanghai is also aimed at providing imitation value to other cities. In the "Key Tasks for the Shanghai’s Pilot Project of Building National Strength in Transportation from the Ministry of Transport" released by the Ministry of Transport, it is explicitly stated that Shanghai, as a pilot project for the construction of the MaaS platform, needs to *"form a batch of advanced experiences and typical achievements, fully play a demonstration and leading role,"* and provide reference for other cities to implement MaaS.

5.2.3 Emerging professionalization of MaaS field and normative pressures

Firstly, the professional development within the government is one of the reasons driving Shanghai to implement MaaS. In the context of China, the Ministry of Transport is the highest level administrative department in the transportation field, playing the role of a central government agency. The Shanghai Municipal Transportation Commission is the highest level administrative department in the transportation field in Shanghai, playing the role of a local government agency. These two organizations have formed a specific relationship in the professional field of transportation.

From the perspective of the internal professional institutional settings of the two organizations, there is a significant similarity between them. For the Ministry of Transport, it has established two professional organizations: the "Comprehensive Planning Department" and the "Science and Technology Department". The former is responsible for organizing the formulation of comprehensive transportation development strategies and policies, organizing the formulation of comprehensive transportation system planning, etc., while the latter is responsible for organizing the formulation of comprehensive transportation standards, information policies and supervising their implementation. For the Shanghai Municipal Transportation Commission, it has established two professional organizations: the "Comprehensive Planning Department" and the "Science and Technology Information Department". The former is responsible for organizing the preparation of comprehensive transportation development plans and special plans, while the latter is responsible for coordinating and promoting the development of technology and information, smart transportation, and green transportation in the transportation industry.

From the perspective of specialized division of labor within these two departments, the "Comprehensive Planning Department" of the Ministry of Transport is a professional organization responsible for formulating transportation development plans at the central government level, while the "Science and Technology Information Department" of the Shanghai Municipal Transportation Commission is a professional organization responsible for implementing transportation development plans at the local government level. There is a high degree of similarity in professionalism between the two organizations that playing an essential role in MaaS development.

Secondly, the educational and professional backgrounds shared by members within the organization are also a major reason for MaaS development. In order to analyze the impact of this on the implementation of MaaS in Shanghai, we combined the actual situation in China and listed the educational backgrounds of relevant officials from the Ministry of Transport, Shanghai Municipal Transportation Commission, and

Beijing Municipal Transportation Commission.

Based on educational and professional backgrounds analysis, the heads of these three professional departments have similar backgrounds. They have all received higher education and generally have an understanding of the knowledge in their professional field. This is because these leaders have obtained diplomas in engineering which is a major related to transportation. Some leaders have also obtained the title of Senior Engineer, which means they have a high level of expertise in the professional field. Usually, only those who have mastered cutting-edge technology and made substantial contributions to professional development can obtain this title. This indicates that officials directly related to the formulation and implementation of MaaS, whether at the central government level or local level, have highly similar educational and professional backgrounds, which is one of the fundamental reasons for MaaS implementation.

The professional development within the organization and the similarity of organizational members mentioned above are the main reasons for the implementation of MaaS in the specific context of Shanghai. In the following text, we will demonstrate some more illustration of professional influence on the implementation of MaaS in Shanghai (see more in Appendix 3).

In the "The 14th Five-Year Plan for the Development of Digital Transportation" issued by the Ministry of Transport in January 2021, the digital development in the transportation field was divided into eight aspects. In the fourth aspect of "building an integrated and connected digital travel network", the Ministry of Transport proposed specific initiatives regarding MaaS, as follows:

".....Create an integrated travel service platform. Advocate the concept of "Mobility as a service", encourage enterprises to integrate multi-modal travel information resources, provide passengers with a full chain, multi-modal, and one-stop travel service, and promote the development of passenger inter-modal transportation and digitization of full service."

(Chapter 3,Article 4)

In the document "The Implementation Opinions of Digital Transformation in the Transportation Industry of Shanghai Municipality (2021-2023)" issued in April 2021, the Shanghai Municipal Transportation Commission defined the digital development direction of the transport industry in the form of "Digital transformation of the transport industry", and also put forward specific initiatives on MaaS:

".....realize real-time, panoramic, and full chain traffic travel information data sharing and inter-working.....promote the construction of the Mobility as a Service system (MaaS)" (Chapter 4, Article 3)

In addition to reflecting the same philosophy in specific strategic formulation, the Ministry of Transport and the Shanghai Municipal Transportation Commission have also conveyed their willingness to collaborate and consistency in action in their respective documents, which are mentioned in the "Safeguard Measures" section of the document. Taking the above two documents as examples, the statement of the Ministry of Transport document is *"encouraging the establishment of collaborative innovation industry alliances, actively carrying out industrial application demonstrations, and cultivating an efficient, adaptable, complementary, and internationally competitive digital transportation industry ecosystem".* The document of the Shanghai Municipal Transportation Commission states that "*focusing on the key links and core areas of the development of digital transformation of the transport industry, guiding and encouraging the establishment of collaborative innovation industry alliances, and achieving resource integration, strong alliance, and complementary advantages.*"

5.3 Internal dynamics of MaaS implementation by city government of Shanghai

In this section we will study the internal dynamics of MaaS implementation by Shanghai Municipal Government through the three different institutional logic. Firstly, we will analyze the influence of three logic by making a table which show the

keywords distribution of institutional logic in the documents we collected (see Table 5). Then, there will be a documentary analysis based on the key elements discussed in framework section (see Table 2).Below, we reflect on the main findings in this regard.

Table 5 The distribution of keywords in three institutional logic in different literature

	TPA		NPM		NPG	
Document	Ref. Point	Occurrence	Ref. Point	Occurrence	Ref. Point	Occurrence
Implementation Plan for Carbon Dioxide Peaking of Shanghai Municipal Government	25	0.36%	81	1.18%	104	1.91%
Outline of the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and Vision 2035 of the Shanghai Municipal Government	100	0.57%	203	1.15%	148	0.95%
Several Policies and Measures of Shanghai Municipal Government for Promoting the Urban Digital Transformation	35	0.53%	68	1.03%	31	0.46%
The 14th Five-Year Plan for the Development of Green Transportation of Shanghai Municipality	10	0.55%	32	1.77%	81	4.30%
The Action Plan for Carbon Dioxide Peaking in Transportation Sector of Shanghai Municipality	24	0.20%	108	0.91%	74	0.67%
The Implementation Opinions of Digital Transformation in the Transportation Industry of Shanghai Municipality (2021-2023)	41	0.51%	108	1.40%	87	1.18%
The Three-Year Action Plan (2020-2022) for the Promotion of New Infrastructure Construction	10	0.24%	39	0.94%	32	0.79%

in the Transportation Industry of Shanghai Municipality						
The White Paper for the Development of Shanghai Municipal Transportation (2022 Edition)	51	0.35%	102	0.72%	110	0.84%
Guidance of the Shanghai Municipal Government on the Comprehensive Promotion of Urban Digital Transformation	31	0.50%	53	0.80%	60	1.09%
The 14th Five-Year Plan for the Comprehensive Promotion of Urban Digital Transformation of Shanghai Municipal Government	14	0.35%	33	0.86%	38	1.11%
The 14th Five-Year Plan for the Development of Comprehensive Transportation of Shanghai Municipal Government	15	0.24%	52	0.87%	51	0.95%
IN TOTAL	356		879		816	

From the above table, it can be seen that in terms of total quantity, keywords representing NPM logic have the highest frequency of occurrence in the documents related to the implementation of the MaaS strategy by the Shanghai Municipal Government, at 879 times. Keywords related to NPG logic have a slightly higher frequency of occurrence, at 816 times, while keywords reflecting TPA logic have the lowest frequency of occurrence in the documents, at 356 times. Next, we will search and match information in the document based on core viewpoints and keywords, in order to find institutional evidence for specific aspects of the MaaS implementation process.

From the document, we can observe more specifically the impact of different administrative paradigms reflected by the Shanghai Municipal Government in formulating policies. Among all the documents, Outline of the 14th Five Year Plan

(2021-2025) for National Economic and Social Development and Vision 2035 of the Shanghai Municipal Government has the highest number of occurrences of the three types of institutional logic, with a total of 100 occurrences of keywords reflecting traditional administrative management concepts, accounting for 0.57% of the entire text. Keywords reflecting new public management concepts have appeared 203 times, accounting for 1.15% while the keywords reflecting the concept of new public governance appeared 148 times, accounting for 0.95%. In other documents, we can also observe the impact of TPA, NPM, and NPG logic on the implementation of MaaS by the Shanghai Municipal Government. The next list is the files with the second and third highest number of administrative paragraphs. The keywords related to TPA logic appear 51 and 41 times in The White Paper for the Development of Shanghai Municipal Transportation (2022 Edition) and The Implementation Operations of Digital Transformation in the Transportation Industry of Shanghai Municipal (2021-2023). Respectively, the keywords related to NPM logic appear 108 times in the Action Plan for Carbon Dioxide Peaking in Transportation Section of Shanghai Municipality and the Implementation Operations of Digital Transformation in the Transportation Industry of Shanghai Municipality (2021-2023). The keywords related to NPG logic appear 110 and 104 times in the Implementation Plan for Carbon Dioxide Peaking of Shanghai Municipal Government and The White Paper for the Development of Shanghai Municipal Transportation (2022 Edition), respectively.

Furthermore, in all documents related to MaaS by the Shanghai Municipal Government, these three institutional logic are manifested as a specific series of keywords. The keywords that appear most frequently in TPA logic are "Function", "Policy", and "Specifications", with a frequency of 117, 87, and 46, respectively. The keywords that appear most frequently in NPM logic are "Management", "Market", and "Cooperate", with 257, 125, and 102 times respectively. The keywords that appear most frequently in NPG logic are "Sustainable", "Governance", and "Share", with a frequency of 191, 156, and 69, respectively.

Next, we will show the specific internal dynamics of the implementation of MaaS by the Shanghai Municipal Government according to the theoretical framework key elements of the particular institutional logic.

5.3.1 Governance philosophy: Bureaucratic but also marketable and cooperative

In terms of governance philosophy, the Shanghai Municipal Government has demonstrated strong bureaucracy in the implementation of MaaS. This is first manifested in the fact that the implementation of MaaS is mainly led and planned by the Shanghai Municipal Government. The evidence is that all relevant documents are issued by the government and strictly adhere to the hierarchical system. For example, the Shanghai Municipal Transportation Commission, as a subordinate department, strictly follows the specific policies of the Shanghai Municipal Government regarding MaaS. In the decision-making process of MaaS, it is difficult to find that the government mentions the role of the market and other stakeholders.

On the other hand, bureaucracy is also reflected in the fact that the legitimacy of MaaS mainly comes from policies and systems, rather than based on performance or stakeholders. For example, in the "The White Paper for the Development of Shanghai Municipal Transportation (2022 Edition)", the Shanghai Municipal Government proposed to *"strengthen legislation in comprehensive and new fields such as smart transportation, and pay attention to the connection between regulations, rules, and normative documents."(Chapter14,Article3).* In the document of "Three year Action Plan of Shanghai Transport Industry to Promote New Infrastructure Construction (2020-2022)",we can find another evidence which also emphasizes that institutions and policies are the foundation for supporting the development of MaaS *"Strengthen the top-level design of the transportation industry standards and normative system framework, form a progressiveness, forward-looking and applicable standards and guidelines system, and support and lead the construction of new infrastructure in the industry." (Chapter 4,Article 3)*

However, it is worth noting that the Shanghai Municipal Government has proposed in almost every document that the development of MaaS needs to adhere to *"government guidance and market leadership".* It means more emphasis on the allocation role of the market to MaaS. For example, in the "White Paper for the Development of Shanghai Municipal Transportation (2022 Edition)", the government proposed to *"give full play to the decisive role of the market in resource allocation and better leverage the role of the government".(Chapter 14,Article 2).* In addition, in some news reports, we can see that the government encourages to *"active participation in market competition, market-oriented operation through data product research and development, data service supply" (Xinhuanet,2022).*

In the specific practice process, we understand market-oriented operation as the government-led "Suishenxing" not maintaining the monopoly position in the MaaS field through mandatory policies, but engaging in market competition with the existing smart transportation system in Shanghai, and continuously optimizing services during this process. On the other hand, market-oriented operation is also reflected in cooperation with third-party platforms. As stated in the strategic cooperation reached between "Suishenxing" and Shanghai Data Exchange, *"both parties will promote the development of standards and system construction for data ownership definition, open sharing, trading circulation, supervision and management, and jointly explore the authorized operation of public data in the transportation field in terms of data business, and promote the listing and trading of data products (CTN News,2022).* According to the news report titled "Shanghai MaaS system launched and many places explored integrated travel services" by the Xinhua News Agency, the MaaS platform in Shanghai *"is also gradually connecting with some private enterprises such as ride hailing, shared bicycles, and inter provincial passenger transportation, aiming to optimize citizens' travel experience through market-oriented competition and cooperation, and further empower ride hailing and ride hailing enterprises to operate in a healthy manner."*

Finally, the Shanghai Municipal Government prefers the organizational structure of cooperation when implementing MaaS. Although the government acknowledged in “the 14th Five-Year Plan for Shanghai Green Transportation Development” that a multi-stakeholders governance system has not really been formed, at the same time, in the "Opinions on Comprehensively Promoting the Digital Transformation of Shanghai", it also said that the implementation of MaaS will *"strengthen the business coordination and data linkage of various information systems such as the government, enterprises and society."（Chapter3,article 2）*

5.3.2 Role of government: controller

The Shanghai Municipal Government plays an important role in the implementation of MaaS. The Shanghai Municipal Government has repeatedly stated in its documents that it still holds the main direction of MaaS. For example, in the document of "The Three-Year Action Plan (2020-2022) for the Promotion of New Infrastructure Construction in the Transportation Industry of Shanghai Municipality", there is a statement of *"Strengthening government bottom line constraints and development guidance..." (Chapter 2,Article 4).* Another document issued by the Shanghai Municipal Government which is "The 14th Five-Year Plan for the Development of Comprehensive Transportation of Shanghai Municipal Government", also stress that *"Adhering to strategic guidance. Implementing the central strategic deployment and enhancing its support for national strategy." (Chapter 3,Article 4).*

In practice, "Suishenxing", as an important operating entity of the Shanghai MaaS system, is composed of six state-owned enterprises, including SAIC Group, Jiushi Group, Shentong Metro, INESA, Shanghai Chenjian Investment, and Shanghai CITIC. This means that the decision-making of this MaaS company is still under the control of national capital. This indicates that the Shanghai Municipal Government plays a steering role in the implementation of MaaS. Specifically, it constrains the legal red line of MaaS implementation and plans future development directions.

5.3.3 Public participation and role of citizen: citizens as consumers but also potential co-creators

On the issue of public participation and the role of citizens in the implementation of MaaS, the Shanghai Municipal Government believes that MaaS is a product that has emerged to meet the travel needs of citizens. Therefore, citizens participate in the implementation of MaaS as consumers. In the "14th Five Year Plan for the Comprehensive Promotion of Urban Digital Transformation of Shanghai Municipal Government", the government proposed to *"carry out application scenario which involves' citizen experience evaluation ', explore the assessment of user experience system." (Chapter 5, Article 5)*. This indicates that the Shanghai Municipal Government regards citizens as users of MaaS products and promotes the development of MaaS by focusing on user experience. In addition, in a 2022 news report titled "Shanghai MaaS system launched and many places explored integrated travel services" by the official media Xinhua News Agency, the keyword *"user"* appeared multiple times, and it was mentioned that the Shanghai Municipal Government *"meets the travel needs of users"* by launching the Suishengxing MaaS app. This also indicates that the role of citizens as consumers is an important aspect of the Shanghai Municipal Government's promotion of smart travel service construction.

On the other hand, in the process of implementing the MaaS project, the Shanghai Municipal government has also put forward some views similar to the long-term goals on the role of the citizens, which can be confirmed in the relevant documents issued by the municipal government. In the two official documents published by the Shanghai Municipal Government, which are "the Outline of the 14th Five Year Plan (2021-2025) for National Economic and Social Development and Vision 2035 of the Shanghai Municipal Government" and "the Implementation Opinions of Digital Transformation in the Transportation Industry of Shanghai Municipal (2021-2023)", some representative keywords such as *"diverse participation mechanisms"*, *"citizen participation in public policy formulation and social governance"* and *"widespread public participation"* appeared.

This shows that currently Shanghai Municipal Government has adopted two different perspectives to view the role of citizens in implementing the MaaS. On the one hand, in some more practical government plans, the Shanghai Municipal Government regards citizens as consumers in the implementation of MaaS. On the other hand, in some government guidelines for long-term development mode and goals, the Shanghai Municipal Government believes that the role of citizens should be changed to MaaS participants and co-creator, that is, in the gradual development of MaaS, citizens are encouraged to participate in the process of policy formulation and implementation, so as to play the role of decision-maker.

5.3.4 Emphasis and values in MaaS development: political arrangement and the social and economic goals

In terms of the emphasis and value in MaaS, the Shanghai Municipal Government stated in the document showing that it will achieve its social and economic goals through different political arrangements. Meeting the travel needs of citizens, solving traffic problems, assuming public responsibilities, promoting market reform and other contents constitute the focus of the Shanghai Municipal Government when implementing MaaS." The White Paper for the Development of Shanghai Municipal Transportation (2022 Edition)" points out that the implementation of MaaS is to *"better meet the requirements of improving residents' living standards and quality of life, better adapt to the changes in traffic service requirements of an innovative society and an aging society, and create better quality transportation for people's satisfaction." (Chapter 5,Article 24).* While "The 14th Five-Year Plan for the Comprehensive Promotion of Urban Digital Transformation of Shanghai Municipal Government" also states that the implementation of MaaS is to improve the travel efficiency of citizens, *"Build a new ecosystem and pattern of digital transportation around the efficient and convenient travel needs of citizens, promote MaaS, and connect travel needs and service resources with data".(Chapter 4,Article 4.4).* In the news report titled "State-owned enterprises in Shanghai promote the construction of MaaS "mobility as a service" system" , it was also mentioned that one of the main

goals of MaaS is to *"enable citizens to travel with zero waiting for transfers, zero conversion for payments, and zero distance for services"* . According to Xinhuanet (2022),Shanghai Municipal Government also applies the MaaS as a solution to travel difficulties such as insufficient urban transportation capacity, traffic congestion, and tight parking spaces.

Some news have mentioned the Shanghai Municipal Government's more specific approach to improve traffic efficiency and provide public mobility services through MaaS. According to a news report on the website of Shanghai Municipal Transportation Commission (2022), "Suishenxing" covers more than 1560 bus routes and 17 ferry routes in Shanghai, supporting the passage of all rail transit lines within the city. And the taxi service relies on the Shanghai taxi unified platform "Shencheng Travel" to integrate information related to over 50000 drivers. Parking services cover more than 4300 public parking lots (garages) and toll road parking lots, as well as 890000 public parking spaces. Another news report (CTN News, 2022) mentioned how Shanghai Municipal Government used the MaaS project to meet the mobility need of some special groups. It said that the government has provided better travel services than before for the elderly, disabled and other groups with special needs. In particular, for the elderly who do not know how to use smartphones when traveling, "Suishengxing" App can provide them with the service of "TV Smart Travel" by the cooperation with "ShenCheng Travel" and Shanghai IPTV business platform "BaiShiTong" . That means ,the elderly passengers can get a taxi by using the TV remote control, and can view the driver's order status, estimated arrival time and other information on the big TV screen.

Secondly, we find that the Shanghai Municipal Government is trying to reduce unnecessary government intervention in the travel sector by implementing MaaS, and further promote the marketization and privatization of smart travel. Evidence of this is that the "Outline of the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and Vision 2035 of the Shanghai Municipal Government"

proposes to *"comprehensively deepen the reform of administration and service and strengthen the rule of law ..... continue to clean up unnecessary administrative measures, ...implement the decentralization differentiated approval authority ."(Chapter 16,Article 1).* Specifically, the Shanghai Municipal Government is deepening the market-oriented reform of smart travel through market competition and cooperation with other companies in the process of implementing MaaS, reducing the government's redundant management measures and approval procedures.

Finally, the Shanghai Municipal Government believes that promoting MaaS can achieve sustainable development in the transportation field and achieve social benefits. On one hand，the municipal government of Shanghai has recognized the imminence of a green transformation in the transportation sector. This is expressed in "The 14th Five-Year Plan for the Development of Comprehensive Transportation of Shanghai Municipal Government" as *"comprehensively promoting green and low-carbon development in Shanghai's transportation sector and increasing the proportion of green transportation."(Chapter 3,Article 3).* And in another official document, "The Three-Year Action Plan (2020-2022) for the Promotion of New Infrastructure Construction in the Transportation Industry of Shanghai Municipality", this opinion is expressed as *"integrated transport more efficient intermodal transport, travel service system more green."(Chapter 3,Article 9).* The Shanghai Municipal Government also holds the opinion that MaaS is a new mode of travel service that helps reduce the willingness to travel by car and promote energy saving and emission reduction in the transportation sector. On the other hand, the Shanghai Municipal Government emphasizes the importance of social benefits. It has repeatedly emphasized the value of "people-oriented" when implementing MaaS. For example, "The 14th Five-Year Plan for the Comprehensive Promotion of Urban Digital Transformation of Shanghai Municipal Government" states that MaaS should *"optimize digital accessibility and face the imbalance of digital application capabilities caused by inter-generational, income, education and geographical differences." (Chapter 4,Article 8).* In addition to meeting the needs of different stakeholders, the Shanghai Municipal Government also

believes that social benefits can be integrated with economy, society and ecology in the process of MaaS implementation ("The White Paper for the Development of Shanghai Municipal Transportation (2022 Edition)"), and that the increase of social benefits can further drive economic benefits, thus forming a virtuous circle.

5.3.5 Assessment of MaaS development:formal but diversifying

In terms of how to evaluate MaaS, the Shanghai Municipal Government mainly conducts formal evaluations based on tools such as indicators, rules, and systems, but also emphasizes the importance of openness and transparency in evaluation mechanisms and standards.

For one aspect, the Shanghai Municipal Government utilizes a formal evaluation based on bureaucratic mechanisms to achieve supervision and control over MaaS. In terms of specific practices, the Shanghai Municipal Government mainly uses existing standards and binding indicators for evaluation. In the document of "The Action Plan for Carbon Dioxide Peaking in Transportation Sector of Shanghai Municipality", There is a specific expression for this as follows, *"Strict supervision and assessment... Fully utilize existing mechanisms for energy conservation and emission reduction in transportation. Strengthen indicator constraints, conduct annual evaluations, form evaluation mechanisms, and timely grasp the progress of work." (Chapter 4, Article 3)*. In addition, in "the Outline of the 14th Five Year Plan (2021-2025) for National Economic and Social Development and Vision 2035 of the Shanghai Municipal Government", the government also proposed to improve the assessment system and include binding indicators. At the evaluation timeline, it proposes the need for pre-evaluation, post evaluation, and annual evaluation.

For another aspect, the Shanghai Municipal Government is also concerned about incorporating different stakeholders, including citizens, into a diversified evaluation mechanism for the implementation of MaaS. In "the 14th Five Year Plan for the Comprehensive Promotion of Urban Digital Transformation of Shanghai Municipal

Government", it mentioned informal evaluation mechanisms such as citizen experience evaluation and user experience system.

This indicates that the Shanghai Municipal Government has adopted a combination of formal and informal evaluations in evaluating the implementation of MaaS. Although the Shanghai Municipal Government currently relies mainly on existing evaluation systems and tools with coercive power, it is also concerned about the necessity of adopting diversified evaluation. This is reflected in the government's mention of using sustainable and transparent evaluation methods to promote the governance of MaaS during the development planning process.

6. Analysis and discussion

Although research on MaaS has been very abundant with regards to promises for sustainability, key elements and related challenges (Hietanen, 2014; MaaS Alliance, 2017; Mark et al., 2018; AI4CITIES.,2020; Smith & Hensher, 2020; Arias-Molinares & Garcia-Palomares, 2020; Jittrapirom et al., 2017; Mulley et al., 2018; Wonget al., 2020), there is still a gap in the literature on the specific context of MaaS implementation (Butler et al., 2020). In particular, little attention has been paid to the reasons behind the government's implementation of MaaS and the governance logic of the public sector. Therefore, our thesis aims to clarify the impact of specific government context on the implementation of MaaS. In particular, our research questions were: *Why the city government implement MaaS? How is the MaaS concept being implemented in specific city government context?*

We choose Shanghai as the research case, and use the theory of institutional isomorphism (Meyer and Rowan, 1977; DiMaggio & Powell, 1983) and institutional logic (Thornton et al., 2012) to conduct an empirical study. We research the reasons for the implementation of MaaS and the governance logic in the specific context of

Shanghai through government documents and news media, and discuss how the special administrative structure in China affects the implementation of MaaS. In this chapter, we make a thorough analysis of the results on MaaS and have a discussion related to the literature on MaaS.

6.1 Combination of isomorphic pressures explaining the reasons of MaaS implementation by the city government

The last chapter summarized the external pressure received by the Shanghai Municipal Government based on institutional isomorphism, and divided it into three mechanisms: coercive isomorphism, mimetic isomorphism and normative isomorphism according to this theory. Here, we organize them in a clearer way.

Table 6 Research findings on external pressures

Coercive	Mimetic	Normative
*In order to achieve the overall goal issued by the higher level government	*Affected by the international environment *The results of imitation of domestic advanced experience *China's special pilot system	*Professionalization within government *Educational background and expertise shared by government officials

On this basis, we combine the special administrative structure of China and the current situation of the transportation industry, discuss the specific manifestations of these external pressures in the specific context of Shanghai, and analyze the external reasons for the implementation of MaaS in Shanghai in the following sections.

6.1.1 Coercive isomorphism：Pressure from higher-level governments

One of the reasons why the Shanghai Municipal Government implements MaaS is to achieve the common goals issued by the higher-level government. These findings are consistent with previous observations in the literature on the MaaS business ecosystem, namely that governments are the gatekeepers and promoters of MaaS (König et al., 2016). To be further, we provide interesting insights in interpreting the coercive authority of government. According to China's special political system, the Shanghai Municipal Government always faces pressure from superiors. However, the central government has not only made demands for the Shanghai Municipal Government. As we can see from the previous chapter, central authorities have put forward common policy requirements for their functional departments and all local governments in China, which means the isomorphism of local government policies.

What's more, the central authorities will not provide any specific solutions. It proposed only a comprehensive development goal, and requested lower level governments to implement them. Under direct pressure, local governments must adopt goals and plans that are consistent with the central government, and continuously refine them in the process. Therefore, the implementation of MaaS is to some extent a specific action choice for the Shanghai Municipal Government to achieve national level common goals. For example, in order to achieve the overall goals of digital transformation or carbon peak issued by the central government, the Shanghai municipal government chose to implement the specific measure of MaaS.

However, not all institutional isomorphism stems from mandatory authority (Dimaggio & Powell, 1983). Below , we will continue to analyze the reasons related to isomorphism with other systems.

6.1.2 Mimentic isomorfism：Imitation of the domestic and foreign successful cases and Chinese characteristics

Firstly, the implementation of MaaS in Shanghai is the result of imitating international

experience. To address the challenges faced, organisations may mimic the practices of their counterparts in order to produce a workable solution (Dimaggio & Powell, 1983). As described in the part of "Promise of MaaS" in the literature review, the implementation of MaaS can help cities improve their governance practices, reduce traffic congestion and achieve sustainable development (Jang et al., 2021; Pangbourne et al., 2018; Zawieska & Pieriegud, 2018). On this basis, we looked for whether the implementation of MaaS in Shanghai to address the above issues mimicked other organisations.

As the empirical findings show, we do not know which specific foreign countries or cities the Shanghai Municipal Government has mimicked, as the documents we collected related to MaaS implementation do not contain statements that draw on international experience and success stories. However, the Shanghai Municipal Government has mentioned in several documents that it wants to build Shanghai into a modern metropolis with international influence. And the goal of Shanghai's urban transport development is to achieve first-class international status. Because Europe is currently the region where MaaS was first proposed and most practiced (Butler et al., 2020). Therefore, in order to solve transport problems and achieve these goals, Shanghai's transport development will inevitably be influenced by international success stories such as those of European cities.

Furthermore, evidence can also be found within China that the implementation of MaaS in Shanghai is to some extent an imitation of advanced experiences developed during the previous pilot work of MaaS in cities such as Beijing and Guangzhou. In a news report, the Shanghai Municipal Government said that it would launch subsequent smart mobility activities similar to Beijing (Xinhuanet, 2022). This shows that the MaaS practice in Beijing has provided some experience for Shanghai.

Finally, we found that the 'pilot system' was also an important reason for the implementation of MaaS in Shanghai, given the Chinese political system. This is an

mimetic isomorphism in the opposite direction. In other words, the central government tends to set up pilot cities or regions to conduct experiments on new things or institutional reforms, and then enable other cities to imitate the experience and lessons of the pilot cities. The Shanghai Municipal Government implemented MaaS in part because it needs to serve as a pilot city to provide reference value for other parts of China.

6.1.3 Normative isomorfism：Common educational background and industry norms

The educational and professional background shared by the members of the organization is a major reason for the role of normative isomorphism. (Dimaggio and Powell, 1983). The organizations that implement MaaS have a group of people with the same educational background or experience. In the process of personnel mobility and industry exchanges, these staff members have developed a common understanding foundation and value orientation for the future development of smart mobility. On this basis, they believe that the development direction of smart mobility in the future is to integrate a variety of travel modes, which can meet the needs of different users. This finding is in line with the current literature on the definition and function of MaaS (Hietanen, 2014; MaaS Alliance, 2017; Mark et al., 2018; AI4CITIES., 2020; Smith & Hensher, 2020). As a result, the Ministry of Transport and the local transport committees have adopted similar patterns of thinking and arrangements for action in formulating and planning specific strategies for MaaS.

Moreover, similar industry norms are also one of the external pressures to promote policy implementation (Dimaggio & Powell, 1983). However, the concept of MaaS has been entered China for a short time and has not been promoted at the national level. Therefore, China has not yet established the standard system and industry standards related to MaaS. This means that the effectiveness of using normative isomorphism to explain the external reasons suffered by the Shanghai municipal government in implementing MaaS is weak.

Based on the above analysis, coercive isomorphism and mimetic isomorphism can to some extent explain the reasons for the implementation of MaaS by the Shanghai Municipal Government, while the explanatory power of normative isomorphism is slightly insufficient.

6.2 Internal dynamics of MaaS implementation by city government of Shanghai

The previous empirical chapter discussed the institutional logic on which the Shanghai Municipal Government relies in the process of governance. Institutional logic theory is the study of how organizations establish the purpose and manner of their actions according to the specific social context in which they operate (Thornton et al., 2012, p. 2). Generally speaking, as societies have evolved, there are three main logic that guide public sector organizations and governments in their actions. In accordance with this, we classified the internal dynamics reflected in the governance process of the Shanghai Municipal Government into three types, namely the Traditional Public Administration (TPA) Logic , the New Public Management (NPM) Logic and the New Public Governance (NPG) Logic.

The first is the Traditional Public Administration Logic, which is rooted in bureaucracy and a focus on formal norms. This logic adheres to the principle of the political-administrative dichotomy and emphasizes the use of existing bureaucratic systems and governance mechanisms to facilitate the implementation of MaaS strategies through the leading role of government (Dunleavy & Hood, 1994; Wu & Lin, 2014; Zhao, 2018). The second is the New Public Management Logic, inspired by the new institutional economics and entrepreneurship, which recognizes the premise of limited government and emphasizes the introduction of market mechanisms in the process of government governance to improve its performance in the three aspects of economy, efficiency and effectiveness, i.e. through a "market-based "and a focus on cooperation with other non-government sectors to enhance the tangible benefits of the MaaS strategy (Holmes & Shand, 1995; Wu &

Lin, 2014; Hughes, 2017). The third is the New Public Governance Logic that taps into civil society and NGOs as a means to compensate for government and market failures (Stoker, 1999; Osborne, 2006).This governance logic encourages social participation in the planning and implementation of MaaS, emphasizing multiple participation mechanisms and valuing the interests of different stakeholders, including citizens, to enhance the social benefits of MaaS.

On this basis, we divide the behavior of government governance into five main aspects, and combine it with the specific administrative structure and transportation industry environment in China to discuss the specific manifestations of these three institutional logic in the specific context of Shanghai. In the following text, we will analyze the internal dynamics of governance thinking reflected in the implementation of MaaS in Shanghai (Table 7).

Table 7: Research results of institutional logic

Elements	**Main observations from documents**	**Dominating logic / combination of logic**
Governance philosophy	• Giving legitimacy to MaaS-related systems and policies through bureaucracy • More emphasis on the allocation role of the market to MaaS • Set up cooperative organizational structure to govern the MaaS	A combination of TPA logic, NPM logic and NPG logic
Role of government	• Government as the main role to steer the direction of MaaS development	TPA logic
Public participation and role of citizen	• The public can participate selectively in MaaS as a consumer • The public are encouraged to actively and autonomously engage in the implementation of MaaS • Citizens are regarded as the consumer of MaaS	A combination of NPM logic and NPG logic
Emphasis and values in MaaS development	• Marketization or privatization to reduce unnecessary government intervention in the field of travel • Driven by the market,	A combination of NPM logic and NPG logic

	responsible for the travel needs of customers • Focus on MaaS-improved traffic efficiency and economic benefits • Provide public travel services and contribute to society • Based on the needs of public travel, the public can enjoy the results of MaaS • Diverse, focusing on different public responsibilities	
Assessment of MaaS development	• Formal assessment based on MaaS rules • Evaluation of actual economic and social benefits based on MaaS • Evaluate MaaS in terms of governance, transparency, sustainability, availability, etc.	A combination of TPA logic, NPM logic and NPG logic

6.2.1 TPA Logic: A traditional governance practice for the MaaS Implementation in Shanghai

The influence of Traditional Public Administration Logic is evident in the implementation of the MaaS strategy by the Shanghai Municipal Government, specifically in the areas of *Governance Philosophy*, *Role of Government* and *Assessment of MaaS Development.*

Firstly, in terms of *Governance Philosophy*, a mixture of three logic is reflected. Whereas TPA Logic functions primarily by providing legitimacy. The Shanghai Municipal Government continues to follow the most traditional approach, i.e. the bureaucratic and rule of law principles, relying on the issuance of administrative orders and the development of formal plans by government to establish the specific practices and objectives of MaaS implementation. All documents related to the implementation of MaaS in the specific context of Shanghai are issued by the Shanghai Municipal Government and its subordinate departments, and these documents show a clear hierarchical character. As the planner and implementer of the MaaS, the Shanghai Municipal Government has clarified its role as the dominant player by issuing norms and administrative arrangements, and relies on the existing

governmental structure to gain the corresponding legitimacy.

Secondly, in terms of *Role of Government*, we find that TPA Logic is the dominant logic. Specifically, the Shanghai Municipal Government is the actor that controls the process and direction of MaaS implementation. This is because all documents regarding the promotion of MaaS in Shanghai are issued by the Shanghai Municipal Government and its subordinate Shanghai Municipal Transportation Commission. Words such as "government bottom-line constraints and development guidance" and "strategic leadership" show the government's leadership position in MaaS implementation. The reference to market mechanisms suggests that the Shanghai Municipal Government is using market mechanisms as a complementary and optimal solution to bureaucratic mechanisms, while controlling the MaaS project. The Shanghai Municipal Government believes that the allocation of resources through the market is the best way to make the MaaS work, so that MaaS implementation is in line with the government's plans and objectives in the transport sector. Therefore, the Shanghai Municipal Government,as a local administrative body, believes that it should play the role of 'steerer' in the implementation of MaaS and ensure the development of MaaS is on the right track.

Finally, the important role of TPA logic is also reflected in the current *Assessment of MaaS Development*. The Shanghai Municipal Government has used the formal evaluation mechanisms and standards in place as an important tool to assess the effectiveness of MaaS implementation. In a number of documents, the Shanghai Municipal Government has referred to the importance of government-established evaluation systems and binding indicators to monitor the MaaS strategy, and has sought to establish annual and process evaluations to ensure that the MaaS development can be supervised by different levels of authorities and to intervene administratively where necessary.

6.2.2 NPM Logic: A comprehensive guidance for the MaaS implementation in Shanghai

In the Shanghai Municipal Government's implementation of MaaS, the New Public Management Logic has a comprehensive and important influence. It is reflected in four areas: *Governance Philosophy*, *Public Participation and Role of Citizen*, *Emphasis and values in MaaS development*, *Assessment of MaaS Development*. The coexistence of different logic is reflected in each of these elements, but it is undeniable that the NPM Logic is an important guide in some of the key issues of MaaS development.

Firstly, the NPM Logic is reflected in the *Governance Philosophy*, which mainly emphasises market participation. The role of the market's allocative role in implementing MaaS and improving the efficiency of travel services is frequently mentioned in documents related to MaaS by the Shanghai Municipal Government. This suggests that the Shanghai Municipal Government holds the opinion that there is a certain complementary relationship between the government and the market in terms of how MaaS governance is implemented. To be specific, it has shown that there is a principle of "government leads, market participates" in the process of MaaS implementation in Shanghai. Keywords such as "management", "efficiency", "consumer", "planning", "market" are the most frequently used words in the documents issued by the Shanghai Municipal Government in relation to the MaaS implementation. This indicates that the Shanghai Municipal Government has made the role of the market an important principle in promoting the development of MaaS locally, which is in line with the fundamental approach of political reform and market-based economic development that China has maintained in recent decades.

Secondly, the emphasis on the market economy and mechanisms has also led the Shanghai Municipal Government to take a more open attitude towards both *Public Participation and Role of Citizen*, *Emphasis and values in MaaS development*. On the one hand, because the Shanghai Municipal Government is influenced by NPM logic

in the implementation of the MaaS, there is a clear market dimension to the definition of the role of public participation and citizens. Since citizens are seen as consumers with a clear need for more smart and convenient mobility solution, they can participate in by putting forward their needs. The Shanghai Municipal Government also encourages this proactive approach, thus providing the impetus for its market-based operation. On the other hand, the Shanghai Municipal Government also believes that it is important to reduce unnecessary interventions in the implementation of transport and mobility reforms, based on the logic that the market plays a leading role, so as to allow the market mechanism to work better. The government, in turn, needs to adapt its strategy according to the travel needs of the public and mobilizes the market as a whole in the implementation of MaaS.

Finally, influenced by the new institutional economics, the Shanghai Municipal Government also tends to adopt some elements of NPM theory in its *Assessment of MaaS development*. For example, the Shanghai Municipal Government has documented that actual economic and social benefits are important indicators for evaluating the development situation of MaaS, and that Mobility as a Service is being used by the Shanghai Municipal Government as an innovative solution in the transport sector to meet the practical needs of citizens. As such, the Shanghai Municipal Government has proposed to focus on the role of MaaS in improving transport efficiency and creating social benefits.

6.2.3 NPG Logic: A promising means for the MaaS implementation in Shanghai

In the Shanghai Municipal Government's implementation of MaaS, the influence of the New Public Governance Logic is also reflected in four areas: *Governance Philosophy*, *Public Participation and Role of Citizen*, *Emphasis and values in MaaS development*, *Assessment of MaaS Development*.

Although the Shanghai Municipal Government has consistently adopted an NPM Logic compliant approach when implementing MaaS, this logic has also plays the

greatest role in the specific environment in Shanghai. However, through empirical findings, we found that the Shanghai Municipal Government has also reflected many NPG Logic related content in the process of developing MaaS, or that this administrative paradigm is an promising auxiliary means.

Specifically, the Shanghai Municipal Government has made pluralistic participation mechanisms and valuing the interests of all stakeholders an important part of its future *Governance Philosophy*. In terms of how MaaS will be conducted, the Shanghai Municipal Government has proposed the future development direction of establishing a collaborative organizational structure. In the documents released, the Shanghai Municipal Government has repeatedly mentioned the problem of "insufficient market and social mechanisms" in the current MaaS implementation process. Therefore, in the future, there is a need to strengthen the cooperation between the government and enterprises and other organizations in the community in terms of business collaboration and data exchange.

The emphasis on the participation of the whole society and the realization of broader social interests has also prompted the Shanghai Municipal Government to hold more advanced concepts in terms of public participation and *the Emphasis and Values in MaaS development*. It is precisely because the Shanghai Municipal Government is influenced by the New Public Governance thinking in the planning, formulation, and implementation of the MaaS. The Shanghai Municipal Government considers the purpose of implementing MaaS from multiple perspectives. In the document, the Shanghai Municipal Government mentioned that promoting the construction of the MaaS platform can achieve multiple goals, including meeting the needs of citizens, solving transportation problems, assuming public responsibility, and promoting market-oriented reform. This indicates that the Shanghai Municipal Government has realized the necessity of assuming diverse responsibilities and contributing to the different needs of society and different groups, including citizens, in the process of formulating and implementing MaaS.

Therefore, in the aspect of *Public participation and role of citizen,* in addition to participating as consumers, the Shanghai Municipal Government is also gradually improving the digital platform for direct participation of citizens. Although it also acknowledges that a multi-party governance system has not yet been truly formed, it also stated in the document that the implementation of MaaS will promote the formation of a "multi governance" pattern.

Finally, influenced by social change and economic development, the Shanghai Municipal Government has tended to adopt some elements of NPG theory in its *Assessment of MaaS development.* For example, the Shanghai Municipal Government has introduced new evaluation tools such as 'citizen experience evaluation' as a complement to formal evaluation mechanisms and market-based evaluation based on economic benefits. The Shanghai Municipal Government has documented the need to accelerate the establishment of transparent, open and sustainable MaaS governance mechanisms so that the development of the strategy can be monitored by society as a whole and the necessary information can be made available to stakeholders, including citizens.This has led the Shanghai government to make the realization of the public and social interests as a long-term orientation of MaaS implementation. The relevant documents released by the Shanghai Municipal Government reflect the importance attached to public needs and are committed to enabling all citizens, including the elderly and disabled, to enjoy the convenience brought by MaaS. This indicates that the Shanghai Municipal Government is increasingly using the value proposition of "people-oriented" as one of its fundamental guiding principles for governance.

However, it is important to note that the NPG statements are mainly "planning" documents, which express a better vision of the future than those of NPM and TPA Logic, which have become realistic measures for the government to implement MaaS. It remains to be seen whether these NPG logical designs can be put into practice. What is undeniable is that the municipal government of Shanghai has already made the transition to NPG logic.

Overall, the above documents reflect to some extent the core viewpoints and keywords of the three logic. This makes us reflect that in Shanghai, the mixing of three institutional logic has become a common phenomenon in the government's implementation of MaaS. This means that the concept of traditional administration, along with the spirit of entrepreneurship and democracy, has appeared in the documents of the Shanghai Municipal Government, and the importance and ranking of these three administrative paradigms can be modified according to specific purposes. Even in the same aspect of MaaS implementation, more than one type of logic will be reflected. This leads us to reflect on the fact that policy implementation is indeed not 'one-size-fits-all' (Butler et al., 2020). As highlighted by previous studies, government departments are the supervisors and promoters of MaaS and play a central role in its implementation (Königet al, 2016; Zhang, 2022). On the other hand, MaaS implementation does exemplify the importance of public-private partnerships (Kamagiani & Matyas, 2017; Wong et al., 2020; Russ & Tausz, 2015). Our research provides further explanations for the government-market relationship in the particular context of China, and for the cooperation between the government and other stakeholders, including citizens.

Specifically, in terms of *Governance Philosophy*, we can find evidence of the influence of all the three institutional logic in the documents issued by the Shanghai Municipal Government, as a result of China's particular political system. It not only adheres to the leadership of the government, but also reflects the characteristics of the times of China's market-oriented reform.In terms of *Role of Government*, the Shanghai Municipal Government has positioned itself as the controller of the MaaS, so we can only find evidence that TPA is working. In terms of *Assessment of MaaS Development*, we can also find evidence of the impact of all three logic in the documents. It emphasizes both formal as well as civic suggestions. As for *Public Participation and Role of Citizen*, *Emphasis and Values in MaaS development,* they reflect the joint influence of NPM and NPG Logic. These observations are in line with the existing literature on citizens' needs (Johansson, 2017; Matyas & Kamargianni,

2018; Melis et al., 2018; Sochor et al., 2018), i.e. the diverse needs of different groups of citizens and the necessity for the government to meet their legitimate demands, especially those of vulnerable groups such as the elderly and the disabled.

So, combining keyword frequencies with the specific evidence above, we believe that the MaaS implementation in Shanghai has been largely influenced by the NPM Logic, while the NPG Logic is showing increasing value, and the TPA Logic still plays a fundamental role.

6.2.4 Special contents of institutional logic in the context of China

We use the lens of institutional logic to examine how MaaS has been implemented by the government in the particular context of Shanghai. It is shown that the mixture of different governance logic used by the Shanghai Municipal Government in the MaaS implementation process is not only a reflection of common international practice, but also a result of the Chinese political tradition.

On the basis of the empirical analysis, we can say that the dynamic changes in the governance logic of the Shanghai Municipal Government during the implementation of MaaS can be seen as a microcosm of the specificity of governance logic in China. In short, similar to many developing countries and even some developed countries, the governance reform of Chinese government institutions has not completed the fundamental transformation from the old public administration to the new public management and post-new public management models. Reform in the Chinese government is an ongoing, dynamic learning process of layering, in which new reforms complement rather than replace old structures and cultures (Christensen, 2020). We believe that the reasons for this phenomenon can be explained in two ways.

Firstly, as a country with a long history and a unique culture, China's administration reflects an inheritance of traditional heritage. This so-called inheritance is an ideological and cultural tradition that has been developed by the Chinese people over thousands of years and which is mainly concerned with the view of the relationship

between the state and society in the Chinese context.

The traditional Chinese ethical culture and philosophy saw the social nature of human beings as the result of natural evolution, leading to the emergence of the "home-country isomorphism" model of governance. Specifically, this institution considers the clan as an extension of the family and the state as an extension and enlargement of the family. The head of clan is the natural leader of the family, and the ruler or authority of the state is seen as enjoying supreme power as a matter of course. This mode of governance is both a social structure and a cultural formation. It emphasizes the similarities in the organizational structure of individuals, groups and the state, and advocates interaction based on blood and kinship ties. This has led to the Chinese civilization being characterized by the unity of the state and society, and the unity of the individual and the collective. In turn, the authorities, represented by the government, not only used law to maintain their rule, but also supplemented it with moral indoctrination to enhance the legitimacy of their rule. This patriarchal style of administration has created a sense of identity and trust in the government.

Traditionally, the people believed that the government, as the administrative organ of the state, had superior judgement and wisdom to make decisions in the interests of the individual and the common good. Thus, the Shanghai Municipal Government, as the authority, did not face any resistance from the public in the MaaS implementation. By issuing a document informing the whole community of the new policy in the field of transport and mobility, the municipal government played the role of parents and provided a solution to the mobility needs of the population.

Secondly, with the development of the age and social transformation, China has also shown some peculiarities in its political system and administrative reforms. Since the Chinese government implemented the policy of Reform and Opening up, China has achieved in forty years what Western countries have achieved in 100 years. This has made it more challenging for China to face social and economic issues and to promote

the implementation of related policies (Christensen & Fan, 2018).

Moreover, influenced by politics, economics and culture, China does not have an administrative-political dichotomy in its administrative practices, and it focuses more on result than process. As such, the Shanghai Municipal Government has referred to the importance of MaaS implementation for urban development, government transformation and solving transport mobility problems rather than values. The Shanghai Municipal Government has adopted an approach derived from different institutional logic in relation to different aspects of MaaS implementation, and this policy choice is based on practical needs rather than on adherence to certain values.

The 'path dependence' in administrative thoughts, which is a result of historical memory and cultural traditions, and the realities of China's modern political and economic reforms have led to a distinctly Chinese character in the process of institutional reform and governance practice. Thus, we can say that the institutional logic from the West has been adapted to the political institutions and cultural characteristics of China, forming a special system with a complex and cascading nature. This combination of governance includes elements of traditional public administration, new public management and new public governance, as well as some unique elements from China's historical development and traditional culture.

7.Conclusion

This thesis presents the results of a documentary analysis of the implementation of Mobility as a Service (MaaS) in Shanghai city government. It provides an empirical explanation of the reasons for the Shanghai municipal government to implement MaaS and the specific implementation methods. Using the ideas of institutional isomorphism theory (Meyer & Rowan, 1977; DiMaggio & Powell, 1983) and institutional logic (Thornton et al., 2012), this thesis discussed why the Shanghai city

government implements MaaS and how.

Our findings show that the Shanghai Municipal Government to implement MaaS is not only because of the direct pressure from the central government departments, as complete the superior departments in the field of transportation issued carbon peak, digital transformation of the overall goal of specific solutions, but also because by imitating the existing successful practice to solve the local traffic challenges. Under the pilot system in China, Shanghai is also exploring the MaaS in order to form a certain promotion value and provide reference for the practice in other regions. In addition, due to the short entry of MaaS in China, there is no direct evidence to link the reason why the Shanghai Municipal Government implemented MaaS to the industry norms.

The analysis of internal dynamics in the implementation of MaaS has shown that the Shanghai municipal government has achieved different goals in the implementation of MaaS by combining Traditional Public Administration Logic, New Public Management Logic and New Public Governance Logic. While emphasizing the decisive role of the market in the operation of MaaS, the Shanghai municipal government also retains a strong bureaucracy in terms of legitimacy and policy making. In addition, the Shanghai municipal government is actively undertaking diversified social responsibilities, also improving the mechanism of enterprise cooperation and citizen participation. This shows that China's special political tradition and institutional arrangements make the Shanghai municipal government also influenced by the traditional governance logic while promoting its own reform. In the internal dynamics of the implementation of MaaS, the new public management logic plays a leading role, and the increasing influence of the new public governance logic and the coexistence of the continuation of the three governance logic.

Therefore, this thesis contributes to the literature related to Mobiliy as a Service in multiple aspects. First of all, as the existing research results have shown, MaaS, as a

new trend in the development of smart mobility, is attracting increasing attention worldwide. Discussions and corresponding practice of the MaaS concept have become a hot topic not only in Europe, where the concept was born, but also in other countries, including China (Li et al., 2018). However, relevant research has rarely focused on the specific background of implementing MaaS, which means that few researchers have conducted specific research on the impact of specific social backgrounds composed of political, economic, and cultural factors on a region or country's promotion of MaaS from conceptual initiatives to substantive actions (Bıyık et al., 2021; Jittapirom et al., 2017; Melis et al., 2018). Not to mention noting that there is not a universal solution in the implementation of MaaS (Bulter et al., 2020), Our thesis provides an interpretive approach to understanding how China's political and social characteristics will influence the practical implementation and development of innovation in transport and other areas. Based on this, we use Shanghai as a research case to explore the specific barriers that the city needs to address under the influence of its unique socio-cultural, political traditions, and stakeholder characteristics, and to implement each action with local characteristics in mind. As a result, we demonstrate the various ways in which external pressures and internal dynamics can coordinate the implementation of MaaS in specific contexts.

In addition, the analysis of MaaS in our thesis may also provide a new explanatory perspective for understanding smart transformation and sustainable development in Chinese cities. Previous literature analyses the role of MaaS in sustainable development, such as reducing CO2 emissions, and suggests that these roles have some implications for urban policy makers (Bıyık et al. 2021; Jang et al. 2021; Pangbourne et al. 2018; Zawieska and Pieriegud 2018). Our study confirms these views, at least for the Chinese government, which affirms the role of MaaS in achieving carbon peaking and green transition, and the government's preference for MaaS as one of the sustainable development options.Furthermore, our study finds that sustainable development policy is not implemented only because of its ecological benefits, but it is also influenced by domestic and international environmental and

government governance logic.

However, we also note that these aforementioned scholars have approached MaaS implementation options and service design from a market or demand perspective on how to better meet the needs of citizens in order to achieve sustainable urban development in the transport sector. As Pangbourne et al. (2018) point out, the decoupling between MaaS implementation and policies in areas such as transport and the environment will reduce the contribution that MaaS can make to sustainable transport. In contrast, our study points out that in the specific context of Shanghai, government authorities are promoting MaaS implementation as a new approach to transport and environmental governance in the city. Thus, we remedy an omission in previous research by providing a new perspective on how government, as the lead actors, are taking concrete steps to implement MaaS, thus providing a new perspective on linking MaaS implementation to sustainable urban development.

However, this thesis has several limitations that provide an opportunity for further research. First, it is limited to a single case and qualitative data findings. More empirical examples should be found in future studies. Secondly, in terms of research theory, we use the institutional isomorphism theory (Meyer & Rowan, 1977; DiMaggio & Powell, 1983) and institutional logic theory (Thornton et al., 2012) also have limitations, which cannot provide a comprehensive explanation of the reasons and methods of the implementation of MaaS by the Shanghai municipal government, especially considering that MaaS is a very novel concept in Shanghai and even in China, and the relevant ideas and practices have great uncertainty in the future development. In terms of research methods, since our research is based on interpretivism, both the description of the phenomenon and the analysis in the research process have certain subjectivity. Therefore, in the following study, we will pay close attention to the development of MaaS in Shanghai, and try to collect more information and data, while also exploring the relevant theories, so as to compensate for the limitations caused by the theoretical defects. Finally, our study was conducted

mainly from a government perspective, rather than by all stakeholders such as businesses and citizens. Therefore, in the next research, according to the actual development of market cooperation or citizen participation, MaaS in Shanghai.

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Appendices

Appendix 1. The Evidence of Coercive Isomorphism

Evidence	Document
"The people's governments of various provinces, autonomous regions, and municipalities directly under the central government, as well as various ministries and commissions of the State Council and directly affiliated institutions... shall conscientiously understand and implement them"	Action Plan for Carbon Dioxide Peaking Before 2030
"Develop intelligent transportation, create an efficient and comfortable public transportation service system, and actively guide the public to choose green and low-carbon transportation methods"	
"Deeply implementing the major strategic decision of the State Council on the programme of Carbon Dioxide Peaking"	Implementation Plan for Carbon Dioxide Peaking of Shanghai Municipal Government
"Constructing a multi-modal passenger transportation system consisting of railways, urban rails, and buses...to promote the gradual transfer of individual motorized transportation to public transportation..."	
"According to the requirements of Implementation Plan for Carbon Dioxide Peaking of Shanghai Municipal Government..... this implementation plan is formulated"	The Action Plan for Carbon Dioxide Peaking in Transportation Sector of Shanghai Municipality
"Promoting the construction of the Mobility as a Service (MaaS) system, enhance the intelligent service capabilities and travel experience of public transportation"	
"Requiring all regions and departments to conscientiously implement it based on the actual circumstances"	The Program of Building National Strength in Transportation
"vigorously develop shared transportation, create a service system based on mobile intelligent terminal technology, and achieve travel as a service..."	
"to implement the decisions and deployments of the State Council, accelerate the construction of a strong transportation country..."	Guiding Opinions of the Ministry of Transport on Promoting the Construction of New Infrastructure in the Field of Transportation
"......Encourage the development of a fully electronic service model that integrates comprehensive passenger transportation and achieves effective connection between different modes of transportation"	
"to implement the work deployment of the Ministry of Transport... to assist in the construction of a strong transportation country".	The Three-Year Action Plan (2020-2022) for the Promotion of New Infrastructure Construction in the Transportation Industry of Shanghai Municipality
"......Real time and full aggregation of comprehensive transportation travel information, conduct research and promotion of the construction of the Mobility as a Service (MaaS) system....."	

Appendix 2. The Evidence of Mimetic Isomorphism

Evidence	Document
"The scale and innovation level of the city's new infrastructure construction should move towards an international first-class level"	The Three-Year Action Plan (2020-2022) for the Promotion of New Infrastructure Construction in the Transportation Industry of Shanghai Municipality
"Build a large-scale urban public digital base with international influence"	
"Building a world-class network of intelligent urban terminal facilities"	
"......Building a leading collaborative vehicle road network and smart roads in China......Building an integrated vehicle life public service platform in the Yangtze River Delta....."	
" Comprehensively promoting digital transformation is the key to shaping the core competitiveness of cities in the future.....Digitization is increasingly becoming the core driving force for promoting economic and social development, it profoundly changes the global production organization and trade structure..... it comprehensively reshapes the urban governance model and lifestyle."	The Implementation Opinions of Digital Transformation in the Transportation Industry of Shanghai Municipality (2021-2023)
"Comprehensively promoting digital transformation is an inevitable requirement for the modernization of the governance system and capacity of mega cities."	
"......promote the healthy development of new digital models and new formats of high-quality livelihood services such as commerce, entertainment, sports, travel and tourism, and accelerate the digital transformation of urban public facilities."	
"Compared to the highest and best international standards, the urban transportation support capacity still needs to be enhanced, and the supply and guarantee level of transportation services need to be further improved "	The 14th Five-Year Plan for the Development of Comprehensive Transportation of Shanghai Municipal Government
"Countries worldwide are using the digital economy as a key lever to boost their economies, and competition and gaming in the global digital economy field will become more intense"	The 14th Five-Year Plan for the Comprehensive Promotion of Urban Digital Transformation of Shanghai Municipal Government
"Accelerating the construction of a socialist modern international metropolis with global influence "	
"By 2025, Shanghai will comprehensively promote urban digital transformation and achieve remarkable results, and build itself into a world-class and domestic leading digital benchmark city"	
" .....to form a group of advanced experiences and typical achievements, fully leverage the role of demonstration and guidance, and provide experience and reference for the construction of national	Key Tasks for the Shanghai's Pilot Project of Building National Strength in

strength in transportation "	Transportation from the Ministry of Transport
" At present, many cities such as Beijing, Guangzhou, and Jinan have carried out exploration of the application of MaaS systems. The application fields of MaaS systems in various regions are very diverse, including public transportation scenarios such as subways and buses. Guangzhou has even launched an autonomous driving MaaS platform, providing various types of services such as autonomous taxis, buses, and inspection vehicles "	Shanghai MaaS system launched and many places explored integrated travel services
"In Beijing, green travel carbon trading relies on the MaaS platform, and citizens can experience the services of the MaaS platform through the Gaode Map App. They can use cycling navigation, pedestrian navigation, or bus and subway travel to obtain corresponding carbon reduction energy, which can be used to exchange for public transportation coupons and other gifts... The Shanghai transportation department plans to encourage citizens to use green points to participate in public welfare activities such as "tree planting and naming" in the future"	
"Focusing on the goal of comprehensively promoting the urban Digital transformation of Shanghai and building an internationally influential" international digital city.....Suishenxing APP will give full play to the functions of the MaaS data platform, open up data islands, dig deep into data value, and drive economic benefits with social benefits."	State-owned enterprises in Shanghai promote the construction of MaaS "mobility as a service" system
" MaaS is a new concept in the global transportation field in recent years. Since its trial operation in Gothenburg, Sweden in 2013, it has caused a huge global response and is considered an important exploration direction for urban transportation transformation. "	"Suishenxing" APP is here! You can take the bus, call a taxi, and find a parking space, and travel freely in Shanghai with "one QR-code"

Appendix 3. The Evidence of Normative Isomorphism

Evidence	Document
"......Create an integrated travel service platform. Advocate the concept of "Mobility as a service", encourage enterprises to integrate multi-modal travel information resources, provide passengers with a full chain, multi-modal, and one-stop travel service, and promote the development of passenger inter-modal transportation and digitization of full service."	The 14th Five-Year Plan for the Development of Digital Transportation
"......realize real-time, panoramic, and full chain traffic travel information data sharing and interworking......promote the construction of the mobility as a service system (MaaS)"	The Implementation Opinions of Digital Transformation in the Transportation Industry of Shanghai Municipality (2021-2023)
"Strengthen communication and coordination with relevant departments, promote the establishment of cross departmental coordination mechanisms, and collaborate to promote green transportation related work"	The 14th Five-Year Plan for the Development of Green Transportation
"Strengthen the overall planning, coordination, and support efforts of relevant functional departments in the field of transportation green development"	The 14th Five-Year Plan for the Development of Green Transportation of Shanghai Municipality