

Rational Choice under Public Interest: Evolution of Shanghai's Transportation Policies from 1986 to 2016

Shao Dan, Xue Meigen

(Shanghai Urban & Rural Construction and Transportation Development Research Institute, Shanghai 200040, China)

Abstract: Urban roadway transportation has obvious non-exclusive and competitive characteristics. Especially in large cities with highly concentrated population, the limited spatial resources cannot fully meet the needs of different travel purposes. Thus it is necessary to introduce scientific transportation policies. The main element of transportation policy lies in the government, the core of the policy is the choice, and pursuing overall social benefits and sustainable development is the policy's value orientation. With the rapid development of urbanization and motorization in Shanghai, this paper systematically summarizes the transportation characteristics and problems in different development stage since the economic reform, particularly after 1986. Aiming at social public policy and governance, the paper discusses the value orientation, general idea, implementation steps and safeguard mechanism in Shanghai transportation policy design in different development stage. Based on the development of major transportation policies such as individual motorized management and public passenger transportation service, the paper elaborates the advantages and disadvantages and the role of government management and market means in management practice.

Keywords: public policy; transportation policy; transportation white paper; public transportation; development history; Shanghai

Received Date: 2016-12-28

About the Author: Shao Dan(1978—), Male, from Nantong Jiangsu, Senior Engineer, Deputy Chief Engineer and Head of Policy Research Office of Transportation Institute, Research Focus Areas: Transportation Policy and Planning. E-mail: sd_nt@163.com

Since the Reform and Opening-Up policy was adopted, Shanghai has entered a new era of accelerated development in urban transportation. The Shanghai People's Municipal Government decided to prepare the first-round comprehensive transportation planning in 1985 and conducted the first comprehensive investigation in the field of transportation across Shanghai in 1986, an important step forward towards systematic planning of transportation development. Urban transportation took off in the 1990s when Pudong was opened up. The overall urban development plan offers direction to Shanghai's space development and infrastructure construction, pilot reforms in fiscal and taxation systems and the land leasehold system ensure financial support, and policy reforms in automobile and housing industrialization offer

important impetus to the development of urbanization and motorization. The macro-system reform leads to opportunities and challenges for the development of urban transportation in Shanghai. Many policies originated during the 1980s-1990s were regularized and optimized in the first decade of the 21st century, based on new development trends and requirements. An overview of Shanghai's transportation policies over the past three decades is crucial for us to draw lessons and sum up experience and will offer guidance and direction for further policy improvement.

1 Stages and Features of Shanghai Transportation Development

The development of Shanghai transportation is

divided into three stages based on key factors including social and economic development, supply of infrastructure, urbanization and motorization.

1.1 Initial Stage: Catching up in Roadway Development (1986-1999)

In the 1980s, Shanghai started the initial process of urbanization and motorization. It had 230 km² concentrated built-up areas and a total population of 12 million, with the average daily traffic volume reaching 20 million people · d⁻¹. In the city center where many functions were clustered, the average population density reached 50,000 people · km⁻², the average employed population density 28,000 people · km⁻² and the total traffic volume accounted for 60% of that of the urban area. As the urban area was small, over 60% of people chose non-motorized travel modes, such as walking and cycling. Buses served as the most important motorized travel mode, accounting for 35% of mode share. During rush hour, buses were crowded, with 11 people per square meter. In 1986, the Shanghai Traffic Management Department designated a specific character (Z referred to private vehicles) for license registration of private motorized vehicles, controlled the total amount of private motorized vehicles and carried out sealed-bid auctions with reserve prices, even before light passenger vehicles were widely used by households and when private motorized vehicles only contributed to 2.5% of mode share. Restricted by social and economic development the supply of infrastructure was seriously insufficient that road area per capita in the city center was only 2 m².

Since the “Seventh Five-year Plan” period (1986-1990), Shanghai had made significant investment in roadway construction and initial results were obvious. However, the generally saturated road networks in the city center and mixed traffic flow of motorized and non-motorized vehicles seriously affected traffic order and led to traffic accidents.

As the development and opening up strategy was implemented in Pudong in the 1990s, the number of newly-built housing estate was increasing in suburban districts and Pudong New Area, accompanied by rapid improvement of supporting facilities and continuous outward expansion of the city. As a result, traffic distribution showed dramatic changes, such as increasing demand for long-distance and cross-river transportation.

During this period, the urban transportation system experienced some new changes:

1) Significant progress was made in construction of roadway infrastructure. Supported by large-scale investment, a batch of backbone infrastructure was constructed and put into operation, including urban expressways in the city center in the shape of Chinese character “Shen” (申), three vertical and three horizontal arterial road networks, Shanghai Yangtze River Tunnel and Bridge, and metro line 1, 2 and 3. Transportation conditions were greatly improved.

2) The number of light passenger vehicles was increasing, which aggravated traffic congestion. The Policy on Development of Automotive Industry issued by China in 1994 encouraged individuals to purchase cars. In the “Ninth Five-year Plan” period, the number of private motorized vehicles increased by 47% to 1.04 million and the number of light passenger vehicles increased by 68%. The improved infrastructure system to some extent accommodated the rapidly increasing light passenger vehicles. Traffic volume increased to 50 million vehicles per kilometer per day. However, in rush hours, the arterial roads in the city center were still saturated, with the average speed of 20 km · h⁻¹ and the outer radial roads faced seri-

Tab.1 Travel mode share of residents in Shanghai urban area

Year	Walking	Non-motorized vehicle	Bus, rail transit	Taxi	Light passenger vehicle and motorcycle	Others	Total
1986	36.6	24.9	35.2	0.2	2.5	0.6	100
1995	36.5	34.4	22.9	1.5	4.5	0.2	100
2004	28.9	22.7	25.1	9.2	14.1		100
2009	26.5	19.5	25.8	8.8	19.4		100

Source: reference^[1].

ous traffic burdens.

3) The service levels and attractiveness of bus were dropping continuously and traditional operational model was not as effective as before. Restricted by bottlenecks, such as traffic congestion and inadequate transport capacity, the passenger volume of bus dropped from the peak value in 1988 (15 million passenger trips · d⁻¹) to 8 million passenger trips · d⁻¹ in 1995, with its mode share decreasing to historically low level (22.9%, see Table 1). At the same time, the mode share of non-motorized vehicles increased rapidly. Personal preference for bicycle over bus, instead of increasing use of light passenger vehicle, is the main reason that leads to the decrease in the mode share of bus.

1.2 Growth Stage: Accelerated Development of Rail Transit Network (2000-2010)

Since the 21st century, Shanghai has started to reshape city functions and strived to build itself into a modern, international metropolis. The second-round overall urban planning required significant changes in urban space layout, expansion of the small city center, balanced development of the whole city, linkage to the Yangtze River Delta Economic Zone, and orderly dispersal of people and industry into suburban areas. Meanwhile, at the national level, great changes took place in housing policy and automobile industrialization policy, the welfare housing system was replaced by market-oriented real estate policy in 1998. To increase the number of light passenger vehicles owned by households was incorporated in the “Tenth Five-year Plan” on national economic development, which offered important impetus for the development of urbanization and motorization. The increasing economic vitality drove rapid growth of traffic volume. Shanghai’s total population reached 23.02 million and the average daily traffic volume reached 52 million people · d⁻¹.

The development of urban transportation at this stage had the following features:

1) The leapfrog development of infrastructure

enabled the urbanization process to move ahead expeditiously. This period experienced leapfrog development in rail transit, passenger transportation hub, high-grade expressways, and inter-city infrastructure. A multimodal transportation system was built in the city, with the city center linked by urban expressways and rail transit, and suburban areas linked by high-grade expressways. The average travel distance increased to 6.5 km, while the average travel time was controlled within 30 min. The population in the city center dropped, while that in the peri-urban area increased at the fastest pace (see Table 2).

2) The rail transit network was initially formed, with more and more standardized transportation services and newly-developed, intensive and balanced transport model. In 2010, 12 rail transit lines (including Maglev) were put into operation, with a total length of 453 km, more than five times the length of the lines in 2000, and the average passenger traffic of 5.16 million passenger trips · d⁻¹. Several rounds of reforms led to the overall layout of rail transit lines and road networks featured by “state-owned enterprises as leading players, multi-party participation, large-scale operation, and fair competition”. In 2010, the number of registered motor vehicles increased to 2.488 million in Shanghai. As the service levels of rail transit and bus were improved, the mode share of public transportation increased constantly, laying solid foundation for optimizing the transport model and ensuring high-quality transportation services during Expo 2010 in Shanghai.

Tab.2 Change of population distribution in Shanghai

Year	City center/10 000 people			Suburb/10 000 people		
	Subtotal	Central area	Peripheral area	Subtotal	Middle ring to outer ring area	Beyond the outer ring area
2000	974	380	594	667	239	428
2010	1 150	350	800	1 152	485	667
Growth rate/%	18.1	-7.9	34.7	72.7	102.9	55.8

Source: Reference^[2].

1.3 Mature Stage: Improved Functions of Comprehensive Transport System (2011 till now)

Since the Expo 2010, Shanghai has entered a relatively mature and stable development stage in transport system. But urbanization and motorization developed beyond the planned target and the government lacked comprehensive coordination in transportation and land planning, industrial layout, and distribution of general and employed population. The neighboring area of the city center sprawled by 1,000 km², and the population reached almost 5 million. The tidal flow feature of traffic was more serious and the conflict between supply and demand was hard to tackle.

The development of urban transportation at this stage had the following features:

1) The growth in infrastructure scale apparently slowed down and the time and space of traffic congestions increased, thus it was hard to meet the demand for transportation services in the metropolitan area. With an increasing trend of individual motorized travel and more and more saturated expressway system, the road network capacity, parking capacity, and environment capacity couldn't afford the rapid increase of motorized vehicles. And the dual-infrastructure structure in urban and rural areas couldn't meet the demand for long-distance and intensive commuting services in Shanghai and the metropolitan area.

2) The prioritized development of bus was challenged by individual motorized travel and newly emerged transportation modes. The increase in the passenger flow of public transportation mainly relied on the rapid development of rail transit network. On the one hand, some sections of rail transit lines were seriously crowded in rush hours and on the other hand, the suburban sections were not efficiently operated. The intensity of the bus passenger flow was low and lacked driving forces for growth. Against the backdrop of building a moderately prosperous society, light passenger vehicle has become a necessity for citizens to improve travel quality. With the rapid development of Inter-

net technology, new transportation modes are emerging, such as e-hailing, carpooling, and car sharing, which facilitate individual's motorized travel, but it's hard to predict their influence on the traditional policies on prioritized development of bus and traffic control.

3) The development of transportation system should meet higher sustainable requirements in broader space. Since the 18th National Congress of the Communist Party of China, the Chinese government has developed national strategies, such as new type of urbanization and construction of ecological civilization. The third-round overall urban planning positioned Shanghai as a "leading global city". How to serve the development of the Yangtze River Delta Economic Zone and the nation as a whole and how to balance the growing demand of transportation and the needs to reduce environmental pollution and carbon dioxide emission are the diversified targets to be achieved by Shanghai at the new stage of transportation development.

2 Principles and Strategies on Shanghai's Transportation Policies

2.1 Value Proposition-Focusing on Social Efficiency

The core of public policy lies in the choice of decisions. The first-edition comprehensive transportation planning of Shanghai started to be prepared in the 1980s defined the strategy on development of passenger transport, requiring to "prioritize the development of public transportation, including rail transit, gradually reduce the scope of bicycle use, control the growth speed and scale of light passenger vehicles, and strictly control the increase of motorcycle in the urban area". Through overview of Shanghai's development features at the three stages, the core issues revolve around the methods to relieve traffic congestion and improve service levels of public transportation as well as sustainable development issues related to ecology and fairness.

The core value of transportation policy is to

achieve overall social efficiency and sustainable development. The unlimited increase of motor vehicles cannot be supported by any city. Even some U.S. cities, whose core driving force relies on the development of light passenger vehicles, now reflect on development consequences and the necessity of transformation. During the development of motorization, it's hard to balance road supply and transport demand through spontaneous actions. It's essential to incorporate the principles of prioritizing bus and green transportation into infrastructure construction, system design, and specific management measures.

2.2 General Approach- Construction and Management in Parallel

In the past three decades, Shanghai's transportation policy has focused on infrastructure construction and comprehensive management. Shanghai developed different strategies based on the development stage of infrastructure: construction-focused strategy at the underdeveloped stage, construction and management in parallel at the infrastructure construction stage, and management-focused strategy at the relatively mature stage. The construction efforts started during the "Seventh Five-year Plan" period and continued into the "Eleventh Five-year Plan" period. The municipal-level and district-level investment in infrastructure construction reached the peak value of 100 billion RMB in 2009, with the current investment remaining at the level of 50 billion per year. However, the key construction districts and focus have been changed. The continued large investment enables shift from "infrastructure in debt" to "functional infrastructure" and is of significance to improve service levels of transportation and promote new transport models. Meanwhile, Shanghai has emphasized the role of transportation management in control and potential release, and developed a series of policies and regulations on the development of transportation tools, road layout and management, and transportation services, among which the policy of balancing road and vehicles was proposed at the construction-focused

stage during the "Seventh Five-year Plan" period. Differentiated policy design is implemented in different areas and the city center is a core area to implement policies, such as traffic flow management, road toll control and transportation regulation.

2.3 Execution Guarantee- Coherence and Coordination Mechanism and System

Comprehensive transportation management covers various sectors: planning, construction, public safety, transportation, and development reform at district, county, town and street levels. At the stage of large-scale infrastructure construction, administrative management resources are concentrated in construction departments to facilitate the construction process. But with the increasing complexity of the transportation system, the balance and coordination of the systems should be further strengthened, and research and decision-making on transportation policies are elevated to a continuous and regular work. The thematic meetings held by the municipal government cannot be a substitute for regular and basic preparatory work done by competent authority for the purpose of decision-making. As the decision-making process is better to be performed at municipal committee (bureau) level, it's necessary to assign a competent authority. Shanghai has started reform in its comprehensive transportation system since 2004, and adopted joint meeting mechanism at the transition period (2004-2005), municipal construction and transportation mechanism at the entity period (2005-2013). Currently, the municipal commission of transport is in charge of related work. It's proved in practice a transportation management department with comprehensive coordination capabilities offers institutional safeguards for scientific decision-making on transportation, implementation, and follow-up work. And the two-round transportation white papers offer guidelines on transportation policies under the coordination management mechanism. Besides the horizontal integration of functional departments related to transportation, clear division of responsibilities and cooperation at the verti-

cal level are also important, as they are crucial for the implementation of transportation policies and measures. Against the backdrop of the Fiscal and Taxation Systems Reform in the 1990s, Shanghai defined a management model featured by power delegation in transportation and assistance between municipal and district levels through issuance of local regulations, which led to orderly construction and development of infrastructure.

2.4 Implementation Roadmap-Joint Participation of the Government, Market and Society

To raise infrastructure construction funds, increase capacity of public transportation, and relieve traffic congestion, in 1990s Shanghai started to explore a market-oriented system in the field of municipal utility and light passenger vehicle management and has made great progress in operation models, management mechanism, and legal systems. Infrastructure construction was funded through more channels, such as World Bank loans, government financing platforms and BOT. The bus line business right system was developed as a basic system for market access and public resource allocation. The private car license auction policy, dating back to the 1980s, and “Six Locations and Six Categories of Parking Lots” charge regulations, dating back to the 1990s, both introduced market means to control development and use of automobiles. The Shanghai Municipal Administration Regulation on Road Traffic implemented in 1997 clearly defined the policy of controlling the number of vehicle registration plates, setting the general tone for automobile management in Shanghai.

2.5 Scientific Decision-making-Completed by Quantitative Analysis

Since Shanghai started to prepare the first-round comprehensive transportation planning, it has developed working mechanisms and technical means, such as comprehensive transportation investigation, sampling survey and transportation planning models. Up to now, Shanghai has conducted 5 rounds of compre-

hensive transportation investigations and developed a mechanism of conducting such investigation every five years. The annual sampling survey gathers information on road speed, traffic flow of controlled sites, residents’ travel, and passenger transport services, offering overall insight into the situation of transportation development. The comprehensive transportation planning models built on the investigation and survey results are aligned with general transportation disciplines and are developed and applied based on actual needs. The Shanghai People’s Municipal Government officially established the Shanghai Transportation Information Center in 2006 and developed a comprehensive information platform on transportation, which have further enhanced the collection, publication and sharing of transportation data.

3 Reflections on the Development Process of Key Transportation Policies

Management of private motorized vehicles and public transportation services are important policy sectors in urban transportation management that are closely related to citizens’ travel. This article focuses on the evolution of related policies and discusses future policy changes.

3.1 Government-led Control of Private Motorized Transportation Means

3.1.1 Policy Framework and Achievements of Light Passenger Vehicle Management

Roadway transportation has obvious non-exclusive and competitive characteristics. Road resources are offered by the government to the public for free. Restricted by the time and space of road resources, the scale of light passenger vehicles cannot increase without any control. The government plays a key role in the management of roadway transportation and has taken a cautious attitude towards the development of private motorized transportation means at the beginning. The first-round comprehensive transportation planning fully forecasted that private vehicle would be updated

from bicycle to motorcycle to light passenger vehicle and thus the government started to control the number of private vehicles before the widespread use of motorized transportation means and offered a clear direction for future policies on private motorized transportation means.

Two basic principles are adopted for the management of light passenger vehicles: “total number control” and “regional differentiation”. “Total number control” refers to quotas control of vehicles allowed to enter the city center through auction of vehicle registration plates. Regional differentiation refers to the implementation of differentiated transportation policies in the city center and suburbs. In the suburbs, an exclusive character (C) of vehicle registration plate is used for those that can only travel outside the city center, but the number of those cars is not controlled; besides the difference in travel right, parking fees, supply of parking space and facility systems vary from region to region. Overall, policies on light passenger vehicles delivered remarkable results. Currently, the total number of light passenger vehicles per thousand people is only 165 vehicles · 1k people⁻¹ (including vehicles registered at other cities and provinces but frequently used in Shanghai) and that in suburban towns reached 160 vehicles · 1k people⁻¹ and that in the city center reached 132 vehicles · 1k people⁻¹, which is a reasonable layout.

3.1.2 Challenges and Reflections on Light Passenger Vehicle Management Policy

1) The rapid increase of vehicles registered at other cities and provinces but frequently used in Shanghai disrupted the implementation of the overall design framework on “total number control” and “regional differentiation”.

Shanghai’s light passenger vehicle management policy is similar to Singapore’s quota license policy, except that Shanghai cannot control and manage the total number of non-Shanghai registered vehicles as Singapore, a city state. By the end of 2015, the number of light passenger vehicles registered at other cities and provinces but frequently used in Shanghai reached about 1.24 million, with an annual

increase of 150,000 in recent years. All of these greatly reduced the effectiveness of vehicle control in the city center, which was achieved by license auction policy of non-operating light passenger vehicles.

2) Light passenger vehicle control is not only an efficiency related transportation policy, but also closely related to livelihood issues.

With improvement in living standards, the demand of light passenger vehicles was increasing, leading to increasing license auction price, speculation, and investment opportunities. Since 2014, the license auction policy of non-operating light passenger vehicles has been optimized and adjusted, focusing on the regulation of auction access conditions, reduction of speculation in auction, and dynamic control of auction price. The optimized license auction policy to some extent inhibited irrational speculation behavior and excessive increase in auction price. However, the increasing number of auction bidders remained a prominent issue, with over 200 thousand bidders participating in license auction every month. This reflected the deficiency of road passage rights and the recognized value of investment in vehicle license. It deserves further consideration on how to effectively manage road passage through license auction policy.

3) Electric vehicles (EVs) and car sharing offer possible directions for exploring future light passenger vehicle policy.

Since 2013, to greatly promote EVs, Shanghai has implemented supporting policy for EV purchasers to receive free EV license plates. The plate designated for an EV cannot be used for another vehicle. The availability of charging facilities is taken as a precondition for EV purchasers. The above mentioned policies can be considered as the implementation of “limited-term quotas” and “obtaining parking space before car purchase” policies. In addition, EV sharing business model represents another exploration of vehicle use and management policies. According to survey results, 63% of car owners will not stop using private cars, but 46.6% of people without cars say they may not purchase their own cars^[3]. This means the car

sharing format will be likely to reduce the number of the second cars purchased by existing car owners and the first cars purchased by people without cars. Therefore, the incremental policy design based on existing policies and restriction system will deliver overall effectiveness.

3.2 Regulation of Public Transport Service Providers and Diversified Development

3.2.1 Policy Framework of Public Transport Service and Its Achievements

Compared with other roadway transportation means, public transport service has some exclusive characteristics in that passengers need to pay for related services. The government regularizes and regulates the service quality of public transport service companies and implements differentiated price management and subsidy policy for non-profit and market-oriented formats. Shanghai implements the policy of regulation following development for public transport services, such as bus and taxi. Specifically, Shanghai develops the services into large scale through market-oriented means and introduces local regulations on market access, system and legal accountability to regulate the development of the industry. Shanghai started to implement the bus line business right system in 2002, which played a positive role in strengthening market conditions and improving service levels. The white taxi seat covers, white gloves, and uniforms reflect a regularized image of Shanghai's public transport services.

3.2.2 Challenges and Reflections on Public Transport Service Policy

1) Fully market-oriented public transport service cannot ensure standardized service and public benefit.

Similar issues emerged at the initial development stage of bus and taxi. The market-oriented reform on "system, mechanism and ticket-based system" in 1996 relieved government burdens, increased the motivation of companies, and balanced supply and demand, but it

also weakened the public benefit characteristic of the industry. The listed bus companies were profit seekers and they didn't offer enough services for areas and bus lines with few passengers. The government started to reflect on how to balance corporate profits and public benefits of the industry and optimize bus lines and network. The Shanghai Administration Regulation on Bus and Tram Operation issued in 2001 further reiterated the public benefit positioning of the bus industry, defined the principles of optimizing line and network layout and regulating services, and developed specific subsidy system for low-charge tickets. The following two rounds of public transportation reform generally centered around the public benefit positioning of the bus industry. Likewise, the rapid development of various players in taxi market in the 1980s and lack of uniform regulations and service standards resulted in the increasing number of complaints on taxi drivers. In the 1990s, company operation and regulated services became the objective requirements of the taxi industry transformation. The Shanghai Administration Regulation on Taxi issued in 1995 incorporated company operation, scale control, government pricing, and regulated services in local regulation, which continued to take effect in subsequent development of the taxi industry^[4].

2) Excessive government intervention and regulation lead to insufficient internal development force of companies.

With the development of rail transit and private transportation in the recent 20 years, the public transportation and taxi industry are faced with great challenges. When the market is well regulated under the traditional regulation model, the issue of insufficient internal development force is gradually emerging and companies lack responsiveness to the changing external environment, including the development of new technologies and new models. The decreasing passenger flow leads to an increasing revenue and expense gap for bus companies and increasing government subsidy. Due to information asymmetry, the public doubts about the efficiency of fiscal subsidy.

The traditional taxi industry cannot compete with the Internet-based e-hailing industry in terms of quantity, price, and service levels. Besides bus and taxi, under the public-private operation model, traditional public bicycles are operated by companies and the operation service fees are paid by the government to ensure financial balance. However, the isolated service areas and mediocre user experience put them at a disadvantage, compared with the emerging intelligent sharing bicycles without check-out stations funded by social capital.

4 Conclusions

Shanghai's relatively robust system of transportation policy is gradually developed over a long time. The two rounds of transportation white papers prepared in the 21st century are important practice and measures that identify problems of the traditional transportation policy system and the future policies should be flexibly adjusted based on new trends and requirements. In the basic and non-exclusive public service fields, such as the use and allocation of road resources, the government should proceed from social and public benefits to reasonably design policies; in somewhat exclusive fields, such as public transport service, companies should act as the main players and the government should focus on service standardization and regulation, and should further strengthen bottom-up participation by designing supporting policies. Especially against the backdrop of "social capital + technical innovation", the government should encourage and regulate emerging business formats, direct the transformation and upgrading of traditional formats, and ensure that the development of transportation is not restrained by social capital and profits.

References:

[1] Shanghai Urban and Rural Construction and Transportation Development Research Institute. Shanghai's Comprehensive Transportation Investigations[R]. Shanghai: Shanghai Urban and Rural Construction and Transporta-

tion Development Research Institute, 1986-2016.

- [2] Shanghai Urban and Rural Construction and Transportation Development Research Institute. Post Evaluation of the 2002 White Paper [R]. Shanghai: Shanghai Urban and Rural Construction and Transportation Development Research Institute, 2012.
- [3] Shanghai Urban and Rural Construction and Transportation Development Research Institute. Research on Development Status of Electric Car Sharing and Policy Suggestions[R]. Shanghai: Shanghai Urban and Rural Construction and Transportation Development Research Institute, 2016.
- [4] Shanghai Urban and Rural Construction and Transportation Development Research Institute. Evaluation Report on Shanghai's Transportation Regulation System[R]. Shanghai: Shanghai Urban and Rural Construction and Transportation Development Research Institute, 2015.