

Research on the Application of PPP Mode in China's Urban Public Transport

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Abstract—It is very important to promote the healthy development, ensure the smooth and orderly operation of urban public transport for promoting the sustainable development of economy and society, promoting urban civilization and guaranteeing the basic travel rights of the masses. In recent years, PPP mode comes into the area of public goods and public services investment and financing system reform. With urban public transport being quasi-public goods, the introduction of PPP mode is conducive to ease the government financial pressure and to improve the efficiency of public transport services. Through the analysis of the process of urban public transport reform in China, this paper analyzes the problems and causes in the process of the marketization, and puts forward some suggestions for improving the application of PPP mode in the field of public transport.

Keywords—urban public transport; PPP Mode

I. INTRODUCTION

The development of urban public transport is convenient for the public, and it has promoted the living standard of the residents. As an important part of urban traffic, the construction and operation level of urban public transport reflects the economic development of the city. China's urban public transport operations have gone through three stages: the government monopoly stage; market-oriented reform stage; anti-privatization stage [1]. The traditional view has been to treat the urban public transport as a purely public product, and the bus service is entirely provided by the government. With the development of market economy, this way exposed a lot of drawbacks. In 1985, the State Council issued a "the Work Report about Urban Public Transport Reform", for the first time to break the government monopoly, and changed the city bus exclusive management system. Dalian, Beijing and a few other cities carried out institutional reform first, and the initial effect of reform is obvious. Because the theory is limited and the government has no effective supervision, the competition of market appeared to be vicious. In 2001, China joined WTO. According to the commitment in WTO rules, China is open for utilities, China should encourage social capital and foreign funds to take part in the construction of urban public facilities and guide the orderly opening of urban utilities by the form of sole proprietorship, joint venture or cooperation [2]. In 2006, the Ministry of Construction issued "the Opinions on Prioritizing the Development of Certain

Economic Policies for Urban Public Transport", which emphasized the promotion of the "bus priority" policy through the implementation of franchise mechanisms. Hefei, Shiyuan, Shenzhen and other cities carried out bus market reform. Due to the entrance of a large number of private capital, the deregulation of government and some other reasons, a series of public transport reform has failed, resulting a severe waste of human, materials and other resources. Since 2009, the reform of urban public transport shows the trend of anti-privatization. Public transport property rights gradually return to be state-owned. It reduced the entrance of private capital, avoided the vicious competition, and also paid more attention to improving the quality of service. However, with the accelerated development of China's urbanization process, people's demand for transportation infrastructure is increasing. A series of infrastructures only relying on government investment, for instance bus shelters, bus terminal station, charging pile and bus, integrated service station and bus parking haven't met the construction requirements of urban public transport. The government needs to broaden the financing approaches to ease the financial pressure. In addition, the bus operators mainly are the government or its designated agencies during the development of urban public transport. Due to the lack of effective incentive competition mechanism, bus operators' operating efficiency and service level is difficult to be fully improved.

To solve these problems at this stage, we need to explore more suitable for sustainable modes development of urban public transport business to solve the problem of funding, and improve the efficiency and service quality of public transport enterprises. In 2014, the State Council's "Guidance on Innovation Focus Area Investment and Financing Mechanism, Encouraging Social Investment" clearly requires all regions to expand the supply of public goods and public services through franchising, etc. in municipal infrastructure and public utilities, transportation and other fields. This provides a feasible way for the reform of urban public transport in China. The introduction of franchise in the field of public transport can attract social capital, and ease the financial burden of the government.

Based on the requirements of openness of public utilities in WTO rules and the policy support of social investment, summarising the reform process and problems of urban public transport in China, this study will analyze the

problems during the public transport reform based on the domestic and foreign research, and make suggestions for the further development of PPP mode. The urban public transport refers to the bus which operating in the fixed line in this study.

II. LITERATURE REVIEW

PPP, Public Private Partnership for the full name. The generalized PPP refers various cooperative relations that are established by the public sector and the social capital to provide public goods or services; and the narrow sense of PPP can be understood as the general term of a series of project financing model. This study explores public-private partnerships in urban public transport from the broad definition of PPP model, especially introducing a competitive approach in order to provide better public goods or services without changing ownership, through formal agreements that allow the public and social capital to take their respective advantages, and establishing long-term cooperative relations of risk-sharing, and revenue sharing. The introduction of PPP mode in urban public transport will be beneficial to improve the efficiency of public transport services, ease the financial tension and speed up the development of urban public transport. Britain was the first country to adopt the PPP mode. In 1992, the British Finance Minister first proposed the PFI (Private Finance Initiative) mode, which is also a kind of generalized PPP. For the study about the role of government and market, scholars believe that we need to improve the regulation, and clear the responsibilities between government and market. Zhao Min (2015) analysed the problems of the PPP mode of urban public transport from the three aspects of the price regulation, entrance regulation, quality regulation and made some suggestion [3]. For the study about the urban bus fares, scholars believe that we need to regulate the pricing mechanism to achieve the balance of bus operating costs and benefits. Yang Tao (2017) and others think that the main reason for the failure of the PPP mode of urban public transport cooperation is the government's excessive price regulation, resulting in significant changes in the cash flow of private capital in advance, and resulting in a large loss [4]. Wang Yongsheng (2012) established a model of linkage mechanism of urban public transport cost, fare and subsidy, which provided a theoretical basis for the government to formulate and implement the dynamic adjustment and management policy of bus subsidy based on linkage mechanism [5]. For the specific application of PPP mode in urban public transport, Yin Yanhong [6] (2015) and Zhang Wenjin [7] (2015) analyzed the problems of PPP mode at present and put forward corresponding development suggestions. In addition, Wang Junhao (2017) proposed the establishment of a modern regulatory system [8]; Chen Cong (2017) carried out a specific study on China's PPP legislation [9]; Medda, Carbonaro, and S. Davis (013)

pointed out that consolidating the policy, law, and regulatory frameworks for infrastructure development in the context of public-private partnerships is needed, with the government providing oversight and control over the process [10].

The research of domestic and foreign scholars shows that the mode of public-private partnership is suitable for the development of urban public transport in China. The research on PPP mode also provides the way for the development of urban public transport in China. Based on the research above, this paper analyzes the successes and failures of PPP mode in China's urban public transport, finds out the problems in the process of reform, and puts forward some suggestions on how to improve the existing research contents.

III. CASE STUDIES AND PROBLEMS OF URBAN PUBLIC TRANSPORT REFORM

A. *Urban Public Transport Reform Case*

The reform of urban public transport has experienced the stage of state-owned monopoly, market reform and counter-privatization. The reform has experienced the twists and turns, but also has the effect. However, there are some unsuccessful reforms. In order to serve the consumers better, improve the efficiency of public transport enterprises, we should summarize the experience and lessons we learned. Typical examples of urban public transport reform are shown in Table I .

B. *Analysis of the Reform Process*

1) *The contradictions between government and market*

In the state-owned monopoly stage, the government as the main body of the bus operation, implemented a comprehensive control of the bus industry. This mode is conducive to avoid vicious competition and ensure the orderly operation of the market, but it will lead to the reduction of service efficiency because of the lack of effective competition. At the same time, it is also dependent on the government's financial subsidies, so it is not conducive to their own reform to promote development and progress. In the stage of market reform, the government transfers the bus industry to the private sector through entrustment, government authorization government fade and so on. The government only provides the necessary control. This mode broke the natural monopoly, the introduction of competition improve operational efficiency and reduce the financial burden. However, due to poor government supervision and unreasonable competition mechanism, the bus industry is facing disordered competition; In addition, due to lower government subsidies, lack of corporate funds, and ultimately driven by interest the bus enterprise set high prices, distribute lines inhomogeneous. Therefore, there are problems of failure if urban public transport services supplied only by the government or the market.

TABLE I. TYPICAL CASE OF URBAN PUBLIC TRANSPORT REFORM

| Location | Time | Urban Public Transport Reform |
|-----------------|-------------|--|
| Beijing | 1998-2007 | In order to break the monopoly, Beijing began to push the bus industry to the market. In 1999, Beijing Bus Co., Ltd. was established; in 2003, the bus began to lose money, financial subsidies increased; in 2006, Beijing bus and Beijing Public Transport Group reorganized assets, bus assets owned state once again. |
| Lanxi | 2001-2007 | In 2001, the enterprise restructuring team of the Lanxi Transportation Bureau auction the Lanxi public transport company as a whole auction; in 2002, private enterprises and state-owned enterprises dispute for the operation of the bus market; due to private profitability, private companies didn't arrange vehicle in the remote line or less passenger line; in 2006, the government repurchase bus company. |
| Shiyan | 2003-2008 | In 2003, Shiyan bus ownership was acquired by Wenzhou Wuma car rental company; In 2005, with the oil prices rising, enterprises can not arbitrarily raise fares, government subsidies are not in place; after four staff strike, in 2008, Shiyan Municipal Committee decided to recover the bus company. |
| Jiaying | 2003-2009 | Jiaying implemented privatization reform by diversified investment and affiliated contract management; contradictions and disputes between public and private partnership and the bus company internal shareholders are continuous; finally, contract was terminated and privatization reform ended. |
| Shenzhen | 2006-2013 | Till 2007, there were 38 bus companies obtaining line franchise with government guidance, market-oriented mode; government relaxed supervision, corporate pricing was too high, the quality of service declined day by day. |
| Guangzhou | 2008-2010 | Guangzhou used foreign capital and bank loans to develop public transport, implemented debt management, and diversified the main business. But there is excessive market competition, lacking of government regulation, and it is difficult to implement the government public welfare policy. |
| Luoyang | 2012-2014 | Luoyang bus company sold 80% of the state-owned shares, but the restructuring process failed to introduce social capital. Because it does not involve vital interests, the restructuring of the business indifference operating conditions, making the restructuring effect greatly reduced. |

Source: literature, network data

2) The Contradictions Between Public Welfare and Profitability

Urban public transport is the quasi-public goods. On the one hand, it has the nature of public welfare to facilitate the travel needs of residents. And low prices to save the cost of travel; on the other hand, it has the nature of business, the fare of the bus as a pillar of the continuous operation of public transport enterprises. Fares, costs, subsidies become most concerned problems of the government, business and consumers. Considering the public welfare, the price was made by government in the urban public transport market reform process; In addition, the implementation of various preferential policies also reduces the income of urban public transport enterprises. Government fares regulation policy reduce the enterprise income to a certain extent, and ignore the realization of corporate interests. After the urban public transport market, the private sector usually ignores the public responsibility and pursues more profits. Not to update the operation of vehicles in time, poor profit line unattended. And bus service staff ratio declined is not uncommon. Government subsidies is another important source of income of public transport enterprises, the amount of subsidies and timely impact the quality of public transport services and operational efficiency.

3) The Contradiction Between Simplification and Pluralism

In the aspect of management main body, as the main body of the bus industry the government can be conducive to management, to ensure public transport public welfare. The introduction of diversified competition in the market-oriented reform, can effectively break the industry monopoly, introduce competition mechanism and improve operational efficiency. In the aspect of operating income, the main business of urban public transport is the line operation; the city bus income is mainly from the ticket revenue and government subsidies. A single operation can ensure that enterprises form economies of scale and win competitive advantage in the target market. However, due to the government's fare regulation and the huge financial pressure of the government, the capital sources of public transportation enterprises are not enough to meet the needs of public transport enterprises. In the aspect of market financing, in the urban public transport market-oriented reform process, China is more inclined to introduce state-owned enterprises, private enterprises to carry out cooperation, and the introduction of foreign investment is relatively small.

IV. URBAN PUBLIC TRANSPORT PPP MODE

A. Urban Public Transport PPP Mode Operation

In the PPP mode, the public transport property is owned by the government department. The public sector and the private sector construct, operate and maintain together as the two main bodies of public transport. Government departments are responsible for design, construction,

supervision, and the level of service and quality. The public sector handed over some of the functions to the private sector through some forms such as the management agreement, lease purchase, franchise, operation and maintenance agreements. Public and private sector take risks together. The Fig. 1 shows the specific PPP operating model.

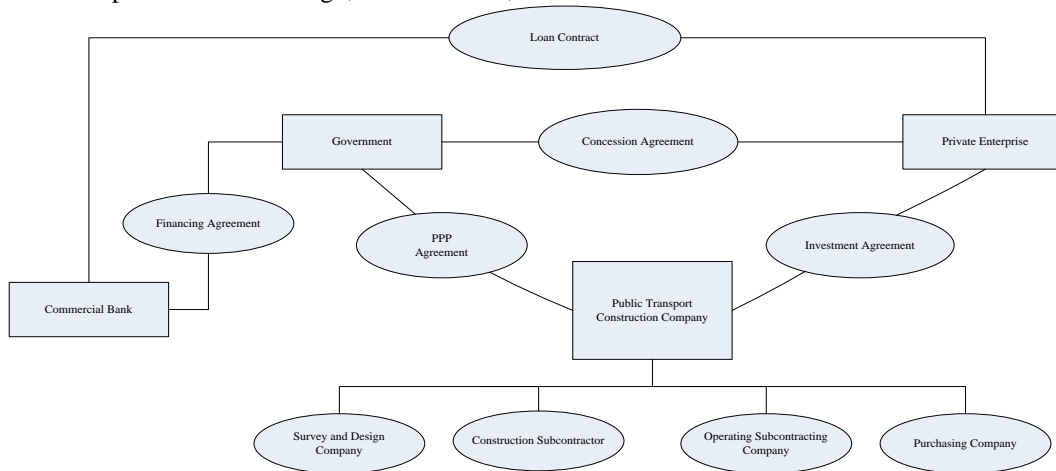


Fig. 1. City bus PPP mode

The first part is the formation of the public transport construction project company. As the project sponsor, the government can choose the most suitable private enterprises through public bidding or invite tender, and jointly set up a public transport project company. The private enterprises could get equity participation of the public transport construction project company by assign investment agreement. And private enterprises achieve return on investment through the acquisition of the project company dividend. The second part is the financing system of public transportation construction. This system involves multi-channel project financing, including commercial banks, insurance companies, provident fund loans and some other links. Multi-channel funds could get into the construction of public transport process under the PPP mode. The third part is the construction system of public transportation. In the process of public transportation construction, the project company is the most important part of financing and construction. The establishment of the public transport construction project company could be completed by the coordination of design companies, construction companies and suppliers.

B. Application of PPP Mode in China's Public Transport Field

In 2014, that the State Council issued "opinions on strengthening the local government debt management" marks the beginning of formal reform of the PPP mode. Opinions clearly suggest that social capital should participate in urban infrastructure and other benefits of public welfare business investment and operations through the franchise, etc., and opinions also stipulate that the government does not allow to be a investor in this mode of

cooperation. PPP mode has been applied in more than ten cities including Hebei, Beijing, Shandong, Henan, Hunan, Hubei, Fujian, Jiangxi, Guizhou and so on. The contents of PPP projects are related to bus lines, urban and rural public transport, public transportation station, new energy bus, bus charging station and other aspects. The applications of PPP mode in the field of public transport are shown in Table II.

V. DEVELOPMENT SUGGESTION OF PPP MODE IN PUBLIC TRANSPORT

A. Coordination: Market Reform and Government Regulation

The most effective way to operate the PPP mode is to achieve the cooperation between the government and market. First of all, the State Council, the Transportation Bureau and other departments should provide a sound policy environment and legal environment for the realization of the PPP mode. Effective policies and laws can regulate the behaviors of the government and the private sector and provide the basis for the project. In addition, in the process of realization of the PPP mode, we should deal with the relationship between government and the private sector well, and clear their respective functions. In the case of the government, the government should realize the transition from the operator to the supervisor, and ensure that the bus enterprises carry out reasonable competition and maintain the market order. Strengthening government regulation is also one of the key points of government's public-private partnership. The main ways of government regulation include price regulation, entrance regulation and quality regulation. The three aspects are mutually reinforcing and indivisible [11]. In order to

stimulate the private sector to provide public service competition awareness, the government should timely and effectively disclosure relevant information. In the bus line planning, project operation, design and maintenance process, we should implement open, fair and transparent contract tender to ensure information symmetry. In terms of enterprises, we should make rational use of decision-making power in urban public transport investment, broaden the financing channels, and actively

introduce social capital in the field of public transport. Perfect market and full competition are the necessary prerequisite for public-private partnership in urban public transport. We should further improve the socialist market economic system, and form a favorable situation of full competition. Only to increase the competitiveness of urban public transport, can we promote the development and the efficiency of bus companies.

TABLE II. SPECIFIC EXAMPLES OF PPP MODE IN THE FIELD OF PUBLIC TRANSPORT

| Province | Time | PPP Project | The Application of PPP Mode |
|-------------------|------|--|--|
| Hunan Province | 2014 | Changsha PPP project about urban and rural public transport integrated | The urban and rural public transport integration in Changsha involved the county-level urban and rural public transport infrastructure planning, design, financing, construction, operation, maintenance and urban and rural bus lines operation, customer service and other functions. |
| Hebei Province | 2014 | Tangshan PPP Project about New Energy Public Transport | Tangshan Shipping Group Co., Ltd., Baoding Changan Bus Manufacturing Co., Ltd. jointly set up Tangshan Transportation Group New Energy Vehicle Operators, the new energy vehicles start to promote PPP mode operation demonstration. |
| Hubei Province | 2015 | Yichang PPP project about bus station | Using the build-operation-transfer (BOT) mode of operation, through the government to grant a certain period of the platform advertising franchise, to attract social capital to actively participate in the construction and operation, to promote market-oriented operation. |
| Hainan | 2016 | Haikou PPP project about bus station | The government authorized to choose social capital by the way of competition. Haikou City bus station investment and construction limited company as a government-funded representatives and selected social capital side co-funded the establishment of the project company. |
| Henan Province | 2017 | Xinxiang PPP project about bus charging station | Xinxiang bus provides earth, and the successful bidder funded to build a charging station. The charging station property owned by Xinxiang bus. Partners charged Xinxiang bus service fee which lower than the social charging service in a certain period of time. |
| Shandong Province | 2017 | Mengyin PPP project about bus line | With the build-operation-transfer (BOT) operation, the project company undertakes project financing, construction, operation, maintenance, customer service duties and transfer. |
| Hunan Province | 2017 | Changde City bus station PPP project | The two main bodies, Changde City Public Transport Co., Ltd. as a government-funded representatives and the successful bidder, jointly fund the establishment of social capital project company (SPV). The project company is responsible for the whole process of management such as financing, construction, operation, maintenance, transfer and so on. |

Source: literature, network data

B. Interest Balance: Public Welfare and Profitability

Urban public transport's public welfare and business makes the fares, costs, and subsidies become the problems that consumers, businesses and the government most concern about. We should pay attention to the balance of public welfare and profitability because consumers, businesses, the government's pursuit are different. For the public sector, the purpose is to introduce private capital into urban public transport, reduce financial burdens, enhance corporate vitality, and rely on the technology and management philosophy of private enterprises to improve

the quality and efficiency of public transport services; for the private sector, they can use the preferential policies to obtain the expected benefits while reducing the risk. Private enterprises can also improve social influence and visibility access to social benefits through social activities; for bus passengers, the government's low fares, high-quality business services can bring high satisfaction to passengers. High passenger satisfaction can attract more residents to take the bus, increase the turnover of enterprises, and enable enterprises obtain higher returns.

In the process of public-private integration, the public

sector can carry out fair risk allocation and benefit sharing between government and enterprises according to the actual situation of bus operation. For the specific fares making, we should gain a comprehensive analysis through the ability to pay of the consumer, and the government within the scope of the financial subsidies and social capital. And we determine a reasonable, tripartite satisfied price ultimately. In addition, we should build the dynamic adjustment mechanism and system construction, and make specific adjustments every 2-3 years according to the actual situation of the three parties [12].

C. Diversified Development: Line Operation and Comprehensive Development

In the aspect of the business main body, as a provider of public transport services the public transport enterprises can form a project company with social capital by the tender. The project company is responsible for project construction such as the bus station, bus shelters, bus terminal station, charging pile, integrated service station and so on. In the aspect of the operating income, in addition to line operating income, the bus companies can increase advertising investment in the bus station, bus stop, and bus vehicles; the company also increases mobile TV, mobile Internet and other new media platform in the bus vehicles. In addition, a single line operating income is low. It may not be able to meet the project company's sustained and stable development requirements. Achieving site construction and line operation integrated design can enhance the competitiveness of the project company. Line operation project company participates in the construction of public transport infrastructure, which can effectively improve the service level of bus stations, and increase the commercial value of the project. In addition to parking, waiting, and service consulting, bus station can join the mall, supermarket and other commercial functions. In the aspect of market financing, the bus companies can set up funds, and financial leasing platform through their own asset investment platform, in order to develop different areas of financial business and put the assets into the business appropriately.

VI. CONCLUSION AND OUTLOOK

The PPP mode of urban public transport is feasible in the process of urban public transport reform in China. This model can effectively alleviate the financial pressure of the government and improve the service efficiency of public transport enterprises. Urban public transport market reform case also further shows that in the process of urban public transport reform, we should coordinate the role of government and the market to achieve balance between public welfare and profitability; in order to promote the public transport enterprises to serve consumers and development better, we should achieve the line operation and comprehensive development. PPP mode of urban public transport is in its infancy. In order to achieve its rapid and stable development, it is necessary to strictly implement the risk sharing mechanism and benefit sharing mechanism and realize the mutual benefit and win-win situation between the

public sector and the private sector. In addition, in order to ensure the smooth implementation of the PPP mode, the government should also strengthen the law which can regulate corporate behaviors; and establish interactive monitoring mechanism.

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