

Risk Analysis and Prevention Research of Smart City Infrastructure PPP

Project

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Abstract: Nowadays, the construction of smart cities in China is in full swing. Infrastructure construction is the cornerstone of smart city construction, and its success or failure is directly related to the development and direction of smart city construction. This paper analyzes the general risks existing in the current infrastructure PPP project, including project adaptive risk, construction and operation risk, and incomplete system and risk, and gives corresponding risk prevention measures according to the risk.

Keywords: PPP project, risk analysis, infrastructure, smart city.

1. INTRODUCTION

Since IBM first officially proposed the concept of a smart city in 2008, it has received widespread attention on a global scale and set off a wave of building smart cities. China is also actively exploring the exploration and practice of smart city construction. Since 2012, the Ministry of Housing and Urban-Rural Development has successively identified three pilot batches of national smart cities and achieved certain results. In the process of building a smart city, infrastructure construction is the cornerstone of its survival and development. It is a basic, critical and supportive work that directly determines the level of construction and success or failure of a smart city.

Due to the wide range of smart city infrastructure, complex engineering and huge cost, the government has adopted the PPP (Public-Private Partnerships) model to promote its construction. Adopting this kind of public-private partnership can greatly help the government to alleviate the pressure on funds and make up for technical problems. However, it is not difficult to find out from the existing literatures and some PPP cases in China that the PPP model still has many problems in the actual construction of China. The changes of laws and regulations, government management, market changes, operating modes and other factors can all lead to a PPP project failure.

Therefore, when applying PPP to the construction of smart city infrastructure, if the possible risks can't be identified and prevented in time, it will affect the smooth progress of the project construction process, and even lead to project failure, which may have a negative impact on the construction of smart cities.

2. RISK ANALYSIS OF SMART CITY INFRASTRUCTURE PPP PROJECTS

2.1 Project adaptation risk

Smart city infrastructure construction is different from traditional urban infrastructure construction. The infrastructure construction of smart cities is based on information, including information transmission networks, government management networks, urban Internet of Things, and traditional infrastructures that have been intelligently transformed. Using the Internet and broadband technology to network the various elements of the city, the interconnection and intercommunication requirements of the urban network are higher, and the regional boundaries of each smart city infrastructure construction project become blurred. Since the infrastructure is no longer confined to a certain area, information security issues such as efficient transmission of information and secure storage have become issues of concern and prevention. In addition, the construction of smart city infrastructure from the physical layer to the application layer requires a relatively complex technical system to support, so its management and maintenance is more difficult to control.

In the process of using the PPP model for smart city infrastructure construction, the characteristics of smart city infrastructure and traditional urban infrastructure are not considered. The process, standards and technical specifications for the traditional urban infrastructure construction using the PPP model are completely copied. Without corresponding adjustments and changes based on the characteristics of smart city infrastructure projects, and not adapting to the project, the PPP model will not only help the smart city infrastructure construction, but will bring unnecessary delays and losses. It will even lead to the insufficiency of the built urban infrastructure projects, which cannot guarantee the satisfaction of the needs of smart cities, resulting in huge waste and loss of social resources.

2.2 Construction and operation risks

2.2.1 Financing risk

Infrastructure is about the future development of smart cities, involving public interests and national security, so it must be left to the government. However, the basic nature and extensive coverage of smart city infrastructure determine its large-scale construction, long construction period, and large capital demand. In the face of such a complicated system engineering, the traditional government self-built self-operated model is not satisfied the insufficient investment needs, and more funds need to be raised by companies and financing institutions. Adopting the PPP model to introduce market mechanisms into smart city construction will alleviate the government's financial pressure.

Generally speaking, under the PPP mode, the government department will sign a franchise contract with the enterprise to form a special purpose vehicle SPV (Special Purpose Vehicle),

which is responsible for raising funds and construction operations of the PPP project. In this process, the financing institution no longer has a direct relationship with the government-financing platform, and the government will provide certain support for the SPV to obtain loans through a corresponding agreement with the financial institution. Therefore, in this process, the public sector such as the government does not have a strong contractual spirit. Alternatively, in the process of attracting investment, “fake and falsify”, conceal or not report the project risk. On the other hand, the qualification of the successful bidder cannot meet the requirements of financing institutions, such as banks and bond companies, do not make timely adjustments to the government's role in the project, which will lead to certain financing risks.

2.2.2 Operational risk

Smart city infrastructure mainly includes new generation network facilities, public service platforms and intelligently transformed urban infrastructure. After the infrastructure is completed, citizens in the covered areas have the right to consume these facilities, and therefore have a certain non-exclusive nature [1]. It can be seen that the construction of infrastructure is used to serve all citizens and cannot be used exclusively or exclusively for commercial or other purposes. Therefore, the operators of smart city infrastructure will face risks from both the project itself and the urban residents in their operations.

After the infrastructure under the PPP model is completed, the government department is responsible for the price and quality supervision of the infrastructure and the private sector is responsible for the day-to-day management, operation and maintenance of the project, and bears the corresponding costs for the infrastructure operation phase. Although enterprises can obtain a reasonable return on investment through “user pays” and the necessary “government payment”, in fact, due to the long period of PPP project, after the completion of smart city infrastructure, the recovery rate of investment income is slow, and the company bears certain financial pressure. At the same time, compared with the life cycle of a PPP project for 20 years, except for state-owned enterprises, the average life expectancy of Chinese private enterprises is only 3.7 years, the average life expectancy of small and medium-sized enterprises is only 2.5 years, and the average life expectancy of large enterprises is only 7-9. In the year, therefore, in the face of such a situation, if there is no reasonable risk sharing mechanism at the beginning of the project, the enterprise will face great pressure on capital recovery during the project operation phase. In the course of operation, enterprises will inevitably pursue their interests and guarantee their own survival by increasing the price of infrastructure or reducing the quality of service, thereby damaging the public interest.

2.3 Incomplete institutional mechanisms

In 2009, smart cities began to receive attention in China. So far, the infrastructure construction of smart cities is still in the exploration stage. At the same time, the PPP model is more complex than the traditional construction model, so it is more necessary to have mature rules to guide the implementation of PPP projects [2].

2.3.1 The regulatory system needs to be improved

In recent years, in order to promote the application of PPP in the field of smart city infrastructure, the state has introduced corresponding preferential policies. In order to obtain more benefits, some local governments have obtained preferential policies and resources in the name of PPP. In fact, the reported projects simply cannot meet the application requirements of PPP. As a result, the lack of integrity in the public sector, the loss of state funds, and the infringement of public interests. Faced with this situation, there is currently no corresponding legal norms and requirements for rectification and improvement.

2.3.2 Institutional mechanisms need to be improved

Urban infrastructure construction is a government-led project. Although the state has repeatedly issued relevant documents to encourage deepening cooperation between the government and social capital, in the face of the huge risks of project construction and operation and the long period of investment income, social capital will still bear Greater pressure. At present, what makes social capital worry is that infrastructure construction projects under the PPP model lack a relatively effective risk-sharing mechanism and exit mechanism. A reasonable risk-sharing mechanism will make it more effective in responding to project risks and safeguarding the benefits of social capital. In addition, in a considerable number of projects, the government has assumed excessive risks, which led to the renegotiation of the project construction and operation, and even the repurchase of the government to close the situation, causing great losses to the government and enterprises. At the same time, there is a certain gap between the project cycle and the life cycle of non-state-owned enterprises in China. Therefore, social capital will be withdrawn during the project construction and operation, resulting in slowing or even suspension of project construction, which will adversely affect the construction of smart cities.

3. RISK PREVENTION OF SMART CITY INFRASTRUCTURE PPP PROJECTS

3.1 Project selection should be “adapted to local conditions”

In the context of the country's encouragement to use PPP to accelerate the construction of smart city infrastructure, not all projects are suitable for PPP mode. In the project selection, the following factors should be fully considered: 1. for specific projects, whether due to information security, project service objects, etc., whether the PPP model should be used for construction; 2. Consider whether the project main construction subject is technically capable, Service support and other aspects have sufficient qualifications to undertake project construction. Smart city infrastructure involves the use of modern information technologies such as big data, cloud computing, and the Internet of Things. This requires that cooperative companies involved in design, construction, facility management, and operations have a deep understanding of smart cities and must have strong information technology. Strength and advanced information technology level. Therefore, in the screening process of cooperative enterprises, the government should focus on the information technology strength of bidding enterprises, and hire experts and scholars in relevant fields to determine technical standards in advance according to the characteristics of the project, and increase the examination and

approval of bidding enterprises. Review. In other words, because smart cities have higher requirements for the interconnection of information and infrastructure as the basis for supporting the intelligent operation of cities, the government must fully consider all aspects of the PPP model combined with traditional infrastructure construction. Colleagues should also combine the characteristics of specific smart city projects, local choice models or cooperation models with enterprises, and must not blindly follow the trend, copy past experience, and the untimely construction model can not meet the actual needs, but will generate more information security issue.

3.2 Improve institutional mechanisms

The maturity of the PPP system has an important impact on the implementation of PPP projects [3]. At the same time, the higher the maturity of the PPP system, the better the implementation quality of the infrastructure PPP project [4]. Therefore, sound legal norms can ensure the efficient operation of the PPP model in the construction of smart city infrastructure, and the successful completion of the project.

In the construction of urban infrastructure, in the form of government and social capital cooperation, we should unswervingly grasp the principle of benefit sharing and risk sharing, so that government and social capital can enjoy equal treatment in the process of project construction. Establishing a sound risk-sharing mechanism should be the primary consideration when the project is established. It requires mandatory requirements from the national legal level. When the government cooperates with social capital, it can make a clear risk assessment of the project and establish effective risk response measures to face risks. There is a reasonable sharing mechanism, the risk should be compatible with the ability to bear, commensurate with the control, coordinated with the degree of investor participation, corresponding to the income, commensurate with the losses caused, and adapted to the economic impact of the project, so that Providing protection for both public and private interests can also provide a safer environment for project implementation.

Secondly, when applying the PPP model to the construction of smart city infrastructure, an effective supervision and review mechanism should be established, and a special review department should be established to conduct in-depth investigation and review of PPP projects reported by local governments to prevent the occurrence of PPP banners. The phenomenon of “clear stocks and real debts” will implement the policy of the central government to promote the construction of smart cities and deepen cooperation between government and social capital.

3.3 Improve the construction and operation mode

The smart city infrastructure PPP project can be divided into a construction phase and an operational phase from a phased perspective. During the construction phase, project participants will pay more attention to the project capital status, so controlling financing risks is crucial for the project itself, and the government plays an important role in it. Premier Li Keqiang is in the 12th National At the fifth meeting of the People's Congress, it was emphasized that "to deepen the cooperation between the government and social capital, the government must take the lead in stressing integrity, and must not change the agreement at will,

and must not "new officials ignore the old accounts." Thus, the government's contractual spirit for project financing and society. The entry of capital is crucial.

In the operational phase, the government adopts the PPP model to cooperate with enterprises. The project is no longer an "exclusive management" situation. The government should change the cognitive attitude of the PPP model. In the project, it is a participant rather than a leader and a supervisor. At the same time, due to the addition of private capital, enterprises should be prevented from sacrificing the principles of people-oriented, sustainable development, staged and value creation for infrastructure operations [5], which harms the interests of the public. Therefore, the establishment of a complete risk-sharing mechanism can not be in a passive position in the project operation phase, while relying on improving policies and regulations, standardizing the operation of infrastructure PPP projects, and ensuring that government and cooperative enterprises have a clear understanding of operational benchmarks.

At the same time, the smart city infrastructure is completed and put into operation. In the face of the uneven moral quality of residents, relevant departments should strengthen organizational education and raise awareness of infrastructure. A set of effective punishment measures should be established for different levels of sabotage. In addition, those who use the Internet to illegally obtain personal information should increase supervision and crackdown, and at the same time improve the technical strength of the construction and operation enterprises, the government and enterprises work together to create a safe network environment for the majority of urban residents.

4. CONCLUSION

Smart city infrastructure construction is a long-term and arduous task. At this stage of China's PPP model is still immature, the use of PPP model to build smart city infrastructure will face many complex risks. This paper only summarizes some of the main risks, and hopes to help the risk prediction and prevention of building smart city infrastructure using PPP model, thus promoting the further development of smart city infrastructure construction.

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