

# PPP Project Management Quality Analysis Research from the Perspective of Risk Management and Control

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## **Abstract:**

The PPP model can expand the scope of the government's resource mobilization and at the same time stimulate the development of the local economy. In the process of PPP project construction, it is necessary to build a sound quality management system to prevent quality risks. The quality management subjects are mainly divided into three aspects: government, social capital and public. From the perspective of risk management and control style, this paper takes the Shanghai garbage disposal PPP project as an example to study the basic ideas and implementation systems of different management and control entities participating in the quality analysis of the project. In the end, this paper puts forward relative countermeasures of the quality control system of PPP projects, which respectively are: implement multi-participated intelligent performance supervision, implement comprehensive contract supervision, complete the approach / channels and ways for the public to participating / participate in the quality supervision and management of PPP projects.

**Keywords:** PPP projects, quality management, risk management subject.

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## I. INTRODUCTION

As the rapid development of economic in the recent years, our country's investment of infrastructure construction has been increasing year by year. Whereas many investment projects have enormous investment and long cost recovery period; these features make the construction motivation of the project seriously insufficient. In order to alleviate this phenomenon, many regions have brought into the PPP model. The PPP model is that the government and enterprises jointly invest in the construction and operation of an investment project. The national government conducts strategic cooperation with local social capital through administrative means such as equity allocation cooperation and franchising rights. The two parties jointly build, jointly bear the project risks, and jointly enjoy the benefits brought by the project. The government selects enterprises with excellent capabilities and qualifications for cooperation, and the enterprises provide products and related services. The government effectively supervises the enterprises, and judges whether the enterprises have completed the work through certain means such as performance appraisal, and then pays the relevant prices. Through this cooperation model, on the one hand, the problem of shortage of construction funds is fundamentally alleviated; on the other hand, the introduced social capital has rich experience in

project construction operation and provides even better services for the projects. By the end of 2021, our country has owned 7,093 PPP projects with a total investment of more than 20.42 trillion yuan. The PPP project has a large investment scale and also has many partners. During the operation period as long as decades, each partner many involve many risk factors, which brings certain difficulties to the quality management of the PPP project. Since PPP projects are mostly public construction projects, from the perspective of project supervision, the government is the first regulatory body for PPP projects. How the government supervises PPP projects so as to disperse and prevent project quality risks has become the focus of the study. Therefore, this paper takes the government as the first subject of risk management and control as the research entry point, and combines the relevant characteristics of PPP projects to fully evaluate the quality of PPP projects. On the one hand, through the research, it can further enrich the current theoretical perspective on PPP project management, and on the other hand, it can improve the government's management of PPP projects.

## **II. PPP PROJECT AND CONCEPTUAL ANALYSIS**

### **2.1 PPP Model Summary**

PPP refers to the acronym of Public-Private Partnership, while many places directly translate it into public-private joint venture. The PPP model can literally be understood as a cooperation model between the government and private enterprises. Through this public-private partnership, the government and private enterprises can jointly realize their economic and social benefits. From the perspective of social governance, the PPP model refers to the government's cooperation with private enterprises in order to mobilize more resources to better provide public services for the people. From a commercial point of view, the PPP model means that the government uses commercial means rather than administrative means to enter into equity cooperation agreements with private enterprises to jointly build and operate related projects, share project risks and share project benefits together. The public sector has transformed from traditional infrastructure and public service providers to makers, collaborators, buyers, and regulators, while the private sector undertakes the large amount of work of project investment, financing, design, construction, operation, and maintenance. There are three main characteristics of the PPP model. Firstly, it is the cooperative relationship between the participating entities. The cooperative relationship is the core feature of the PPP model. The PPP model is different from the previous regulatory relationship between the government and enterprises. The two principals have an equal partnership with each other under the PPP model. The cooperative relationship is equal, and everyone is an equal cooperative relationship regardless of the number of the participates. Secondly, the benefit is shared under the PPP model. The original intention of setting up the PPP model is to alleviate the situation that the local government has tight funds for infrastructure construction. After the introduction of enterprises, related projects will be built jointly by local government and the enterprises. Since under this model, the enterprise is the main initial investor in the early stage, it is necessary to establish a reasonable profit adjustment mechanism in order to ensure that both the enterprise and the government will be able to have a reasonable income, and to avoid that the price is too low for the project construction party to recover the investment, and only by establishing a reasonable income sharing mechanism can keep the PPP mode running even more healthily. Finally, the government and enterprises

share the project risk jointly. The participants in the PPP model are partners with equal cooperative relationship, and the construction process of the project is full of various risks. In the process of encountering risks, the participants must share the responsibility.

## 2.2 Total Quality Management

Total quality management refers to a type of system that improves the quality of products in each department during a project. Total quality management is a type of quality management method and idea, which enhances the enforcement of the entire team through total quality management of the project. Total quality management consists of three aspects in total. First, user-centered quality management. The user is the core of the project, and also the ultimate service object of total quality management. Second, total quality management requires all departments of the project to participate in the management of the project. Whether it is the preliminary investigation and survey, the project construction or subsequent operation, all employees are required to perform their own duties and get fully involved in the quality management work. Third, the key point of total quality management is to carry forward continuously. Quality management does not have only one standard but should be continuously promoted with the progress of the project. Therefore, total quality management needs continuous promotion and improvement of quality management.

## III. INSTANCE ANALYSIS OF TYPICAL PPP PROJECT

### 3.1 Project Analysis

This case is an environmental PPP project located in Shanghai. The project mainly aims to carry out environmental quality transformation and operation of a waste treatment project in an old port. The specific implementer of the project is the Municipal Environmental Sanitation Bureau, which is the main body of quality supervision in the whole process of the PPP project and conducts quality management in the whole process of project construction. However, the government is unable to achieve a 24-hour supervision of the project every day, so in order to ensure the quality of the supervision of the project, the project department has also hired a third-party organization to supervise the project comprehensively. At the same time, during the operation of the project, relevant organizations will also be hired to supervise waste disposal. In order to ensure the fairness and openness of the project's environmental supervision, the project has also introduced a mechanism for public supervision and evaluation, and the public can provide valuable opinions and suggestions for the project. In addition to these supervising tools, the project also supervises the whole process of the project by means of performance. Once a company fails to meet the requirements of relevant performance supervision, the project has the right to claim compensation. Through the above analysis of the project supervision process, we can find that the supervision of this PPP project is relatively comprehensive.

### 3.2 Research on Specific Regulatory Responsibilities of the Participants

From the analysis in the above text, there are three main regulators of the project, which are government, society and public respectively. The composition of the three parties' supervision is shown in Table 1 below.

**Table 1 Projects regulated by three parties**

Regulatory Body	Composition
Government	Sectors like municipal bureau for urban planning, municipal environmental protection agency, municipal quality supervision department, municipal development and reform commission, etc.
Society	Research institute of environmental sciences, law firm, etc.
Public	Permanent residents nearby the project.

The quality supervision

responsibilities during the whole process of project construction are divided into three stages, which are earlier stage of construction, construction and operation after construction.

The quality supervision responsibilities in the early stage of the project construction are shown in Table 2 below.

**Table 2 Responsibility for quality supervision in the early stage of project construction**

Stage of project	Supervision responsibilities
Stage of Project Review	The Cityscape and Sanitation Bureau and the Municipal Development and Reform Commission are mainly responsible for reviewing the various documents of the project and making an overall assessment of the project investors.
Stage of Attracting Investment	Relevant departments form an investment promotion team, design investment promotion plans, and submit standard documents to the government for approval.
Stage of Invitation for Bids	Issue the tender announcement, which is surveyed and investigated by the investors, and then conduct a comprehensive evaluation of the investor, including the investor's ability, quality, level and experience. In the end, confirm an investment partner through a comprehensive evaluation.
First Evaluation of the Project	Conduct relevant evaluations on residents near the project, encourage the public to respond to the impact of the waste treatment project, and put them on public display.

During the construction phase of the project, the main supervisory

bodies are the supervisory unit, the Municipal Construction Committee, and the Cityscape and Sanitation Bureau. The supervision needs to refer to the relevant provisions of the "Technical Guidelines for Municipal Solid Waste Disposal" in the design phase. Sufficient preparations must be made before project construction. Besides, detailed quality control plans should be made as well and the sanitation bureau is in charge of the supervision of on-site construction quality. The supervision of the project operation stage is mainly carried out by the operation party, society and the public. With the close cooperation of the three parties, the waste treatment project will be supervised in an all-round way, and the supervision fee will be borne by the sanitation department and the company jointly.

## **IV. ESTABLISHMENT OF PPP PROJECT QUALITY MANAGEMENT SYSTEM BASED ON RISK MANAGEMENT CONTROL SUBJECTS**

### **4.1 Basic Ideas of PPP Project Quality Management**

From the previous case in the above text, there are mainly three types of quality management systems for PPP projects. They are government supervision system, social supervision system and public supervision system respectively. The three systems act together to PPP project's full life cycle, while PPP project quality supervision in the full life cycle needs to set a practical goal. Combined with the case, this paper believes that the current PPP project supervision goals in our country mainly include the following three aspects. First, through quality supervision, the construction and operation management quality of the project can be greatly improved. Most PPP projects are public projects, and the quality of public project management is directly related to people's lives. At the same time, most PPP projects are special monopoly projects, and there is no market factor to adjust the project construction and operation, so it is necessary to adjust the project by means of its quality supervision. item is adjusted. Second, through quality supervision we can propel the projects to gain higher social benefits. From the perspective of the previously analyzed waste treatment projects, the purpose of the waste treatment project is to guarantee the disposal of regional household waste and provide the masses with a clean living environment, so this project belongs to Public projects, and the government is the main builder of public projects, hence whether the quality of the project is high or low will have a direct impact on public benefits. Third, through quality management we can achieve triple-win. The PPP model is to introduce social capital into public projects, so as to achieve a win-win situation among the three parties of government, social enterprises and the public. Therefore, from this perspective, to achieve a win-win situation, we must adhere to the high quality of the project, thus after the long-term project operation period is over, a win-win situation among three parties can be achieved.

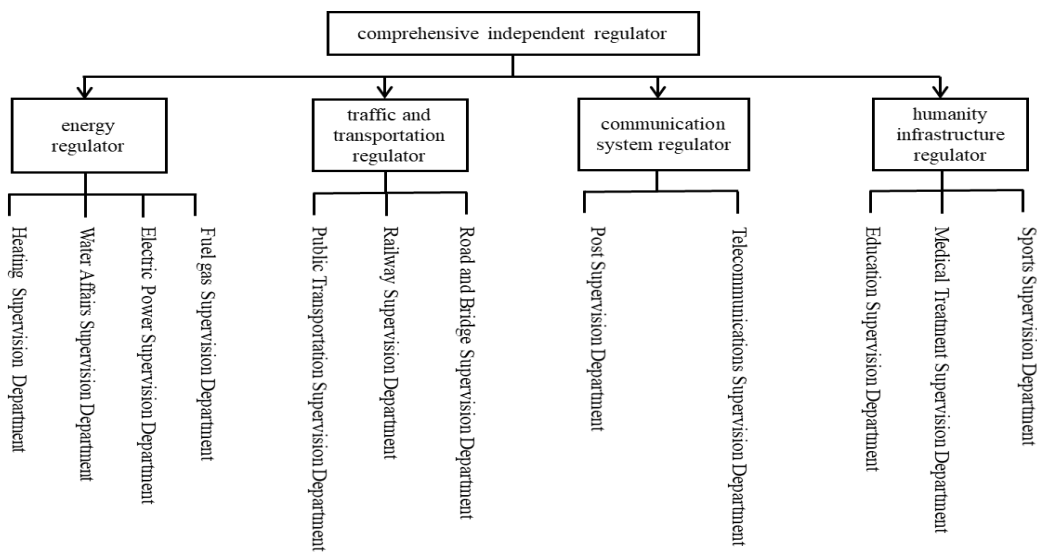
The main principles that need to be adhered to in the quality management of PPP projects are: first, the principle of supervision according to law. Each participant in a PPP project is an independent and equal individual, so it is necessary to conduct quality management through laws and regulations and regulatory contracts. Second, the principle of publicity and accountability. Most PPP projects are public projects. Therefore, it is necessary to adhere to the openness and transparency of information. At the same time, when quality problems occur, the relevant responsible persons must be prosecuted for criminal responsibility. Third, the principle of collaborative supervision. The supervision of PPP projects has never been the responsibility of the government alone but requires the participation of all participants and the ultimate beneficiaries of the public, and all subjects cooperate to realize the supervision of project quality.

### **4.2 Implementation and Deployment of PPP Project Quality Management System**

Because of its particularity, PPP projects lack the regulation of the invisible hand of the market. In order to make up for this lack of supervision, the government must assume an important responsibility for supervision. However, there are many government departments, and the regulatory bodies involved are also very complex, and it is easy to cause problems of unclear rights and responsibilities. Therefore, it is

necessary to formulate a sound regulatory system according to the nature of the project. The state formulates the regulatory agency system, and then the local government formulates the specific regulatory system and process according to the project. Chart 1 below shows the layout of regulatory agencies for PPP projects in Shanghai.

**Figure 1 Layout of government regulatory organizations**



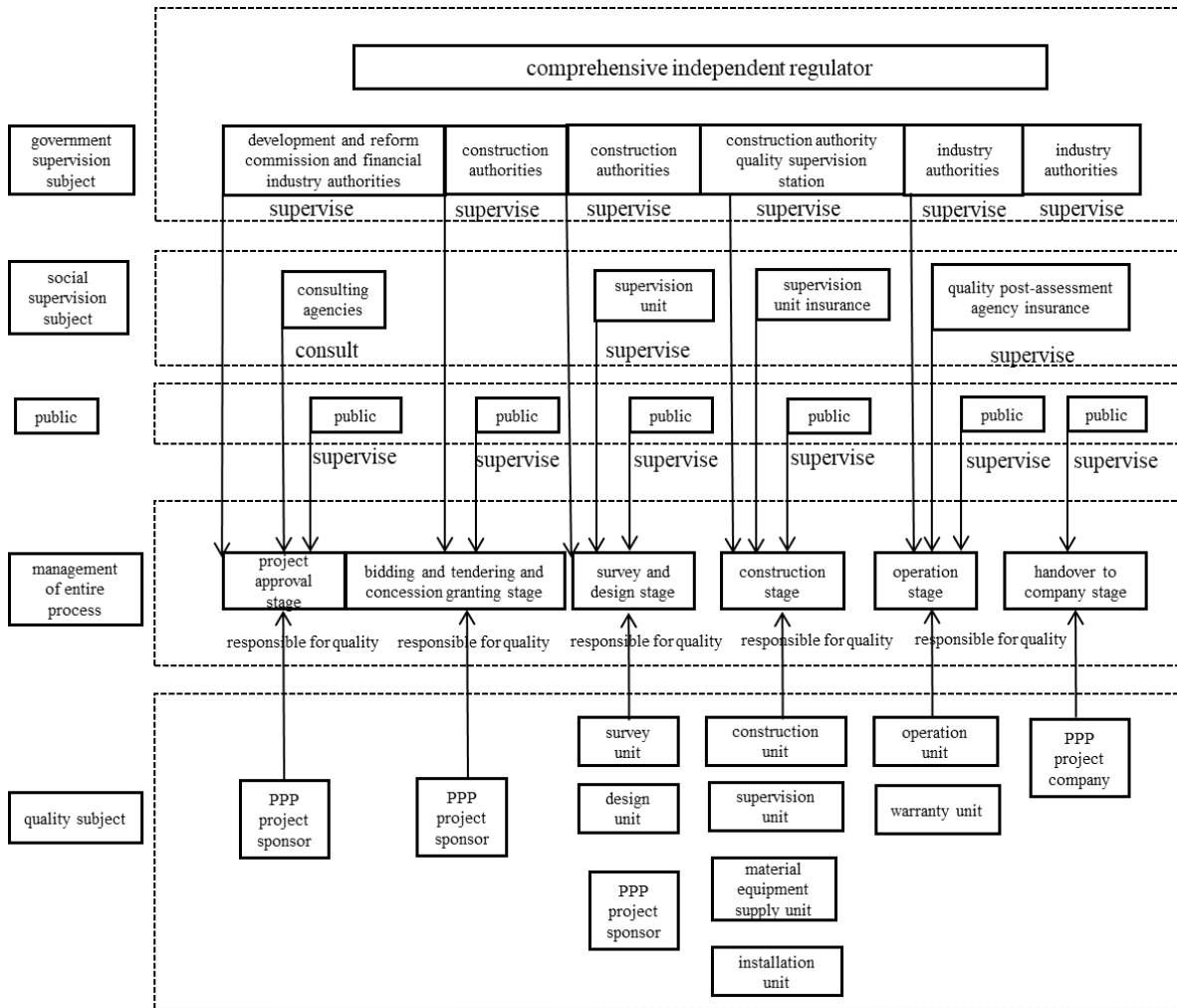
In order to better supervise quality management of PPP projects, in addition to government participation, quality supervision entities at the social aspect are also required, which includes consult department, supervision department, quality testing institution, evaluation institution, etc. These subjects cover all aspects of project construction and are independent of each other. They perform quality supervision responsibilities according to relevant contracts, and ultimately ensure that the construction quality of PPP projects meets project requirements.

The subjects of public supervision mainly include four categories, namely experts and scholars in various fields, users of PPP projects, the public involved in the construction and operation of PPP projects, and groups interested in the projects. Public supervision is an indispensable supervisory body in the quality management of public projects and runs through the whole process of the project. During the project approval stage, the public that are affected by all the demolition involved in the plan and construction of future projects, as well as the noise and dust pollution during the construction can participate in the supervision of the project approval stage. In addition, the construction of public projects also requires the participation of economists, industry experts, engineering construction and other professionals. These participants play an important role in the preliminary demonstration of the project, and during the project construction process, All the four types of public supervision subjects can participate in the supervision of the project.



All the above-mentioned supervisory bodies can participate in the management of project quality at different stages of the project. The basic framework for specific supervisory bodies to participate in quality is shown in Chart 2 as follows.

**Figure 2 PPP project quality management supervision system**



## **V. CONSTRUCTION OF QUALITY MANAGEMENT SYSTEM FOR PPP PROJECTS**

### **5.1 Implement Intelligent Performance Supervision with Multi-participation**

In the whole process of the PPP project, the realization of the quality management objectives is the performance of the project. In PPP projects, the government mainly checks the achievement of service quality to see if the results are in line with the original goals. The government does not pay attention to the project construction plan formulated by social capital to meet the target requirements, but just conducts quality management and supervision of the project. This is not only conducive to the participation of social capital and other entities to exert the initiative of operation, but also to the exertion of the enthusiasm of operation. The role of the government has changed from the builder and executor of traditional projects to the supervisor of the project. The supervision of the production quality in the construction stage and the supervision of the service quality in the operation period are the focus of government supervision. In service quality management, many foreign countries (regions) have adopted performance monitoring. Funding for performance monitoring is shared by all companies involved in government programs. The government is only responsible for the initial supervision or routine inspection, and if the project company itself causes secondary inspection due to unqualified performance, the cost will be borne by the project company. The setting of functional performance objectives should proceed from the actual situation of the project. We cannot set too difficult performance, but the performance standards of the core quality of the project cannot be relaxed.

### **5.2 Implement Overall Contract Supervision**

The basis for the birth of the PPP project is that the government forms a public-private partnership with social capital by signing a contract, establishes a franchise company in the light of the project, and jointly develops, constructs and operates public PPP projects. The government supervises and manages the quality of the entire project in the process. Since the government and social capital and other participants have equal relationship in PPP projects, although the government is the subject of quality management, there may still be some regulatory issues. Therefore, it is necessary to clearly stipulate the relevant quality management supervision content in the process of signing the initial contract of the project, such as: the standards to be followed in all stages of the project, the final construction quality standards of the project, and the final target. In addition to this, it is also necessary to confirm the dispute resolution method for quality disputes, the responsibility sharing system for quality risks, and the rights and obligations enjoyed by all participants in quality management. Through the implementation of overall contract supervision, it becomes lawful for the subject to fulfill the supervision responsibility.

### **5.3 Improve the Channels and Ways for the Public to Participate in the Quality Supervision and Management of PPP Projects**

The rights of the Chinese government are endowed by the people, and the ultimate beneficiaries of PPP projects are also the people. Therefore, the people need to participate and also should participate in the



quality supervision and management of PPP projects. In order to let the public be able to better participate, firstly, the government should lay emphasis on the publicity. As for the waste treatment projects studied in the test, the government should strengthen publicity from the stage of preliminary investigation of the project, so that the public can increase their awareness of participating in public services. Meanwhile, the government should actively publicize typical cases to improve the subjective initiative and autonomy of the public. Secondly, the government should attach importance to the establishment of a public supervision mechanism. Public supervision should not be just verbal words, but should build a sound public supervision mechanism, and comprehensively collect the public's opinions on PPP projects, and at the same time earnestly listen to the core demands of the public and give full play to the public's role in quality management and supervision. Finally, establish a smooth information communication channel. In 2009, people in Xiamen protested against the PX chemical project. The people were worried about the opacity of the project. The government believed that the people's protests hindered the development of the local economy. Therefore, in the quality management of PPP projects, the government should establish a smooth information communication channel to achieve smooth communication between the government and the public. At the same time, the progress of the project should be announced to the public in a timely manner, especially the major quality problems of the project, and the public has the right to be informed.

## VI. EPILOGUE

The PPP model is that the government and enterprises jointly invest in constructing and operating related projects. The national government conducts strategic cooperation with local social capital through administrative means such as equity distribution cooperation and franchising. The two parties jointly build, jointly bear the project risks, and jointly enjoy the benefits brought by the project. The PPP model can expand the scope of the government's resource mobilization, and at the same time, it can stimulate the development of the local economy through infrastructure investment. It is precisely because of these advantages that PPP has achieved rapid development in recent years. However, most PPP projects are public projects and are closely related to people's daily life, as a result, in the process of construction and operation, it is necessary to pay more attention to the relevant quality risks, while to prevent the quality risks of PPP projects, it is necessary to build quality management systems jointly participated in by all the three parts of government, social capital, and public. The entire process of the quality management is carried out in the whole process of the project by building a perfect supervision system. In the project quality management and supervision, it is necessary to give full play to the subjective initiative of different subjects, especially the participation of the public. Through the active participation of the public, on the one hand, the quality of project supervision can be improved to the greatest extent, and on the other hand, it can enhance the public's satisfaction with the project. Thus, it can make the PPP project get the support of the public and avoid mass incidents caused by ineffective communication and other reasons.

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