

# The Construction of PPP Project Risk Evaluation System under the Background of New Urbanization

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## Abstract

**When there are more and more forms of PPP financing in the market, it is not difficult to find that PPP model itself has many advantages, but also its risk problems are increasingly significant. If it is not treated carefully, the government and social capital will suffer serious losses, and the project will not fail to achieve the expected results. Therefore, it is very important to establish a scientific and comprehensive risk assessment system for the project risk assessment.**

## Keywords

**PPP project, risk assessment, index system.**

## 1. Definition of PPP Project Mode

PPP project model has two definitions: broad and narrow. In a broad sense, PPP project model refers to a cooperation mechanism established by the government and the private sector, whose purpose is to provide public goods and services more effectively. In a narrow sense, PPP mode refers to a series of financing combination modes or portfolio modes in project investment and financing. It is the further improvement and improvement of BOT financing mode, focusing on the sharing of project financing risks and the time value of funds, and gradually becoming the mainstream financing mode to promote the pace of infrastructure construction in the process of urbanization in China.

## 2. Definition of PPP Project Financing Risk in the Context of New Urbanization

Risk refers to the uncertainty of future results. Project risk is often referred to as the deviation from the expected effect in the process of project implementation, the probability of deviation and the adverse impact caused by deviation. According to the complexity of the project, project risk is very important for the smooth implementation of the project and the expected effect.

The risks of PPP project mainly include the early planning and design of PPP project implementation, the mid-term project construction, and the later stage of project operation and final handover. The uncertainty caused by various deviations between the specific implementation process and results and the expected effect.

### **3. Risk Characteristics of PPP Project in the Context of New Urbanization**

#### **3.1. Complexity**

According to the definition of PPP project, PPP project generally involves the participation of government departments, social capital, financial institutions and contractors' intermediaries. Different departments determine their rights and obligations by signing contracts and agreements. In general, PPP projects are usually large-scale, time-consuming and have a cycle of more than 10. In the process of project implementation, they are often affected by changes in external environment, including policy, social environment, natural environment, etc. Therefore, we should fully consider the complexity and diversity of PPP project risks.

#### **3.2. Phasing**

Due to the long period of PPP project and the complexity of the project, the risks faced by each stage of the project are different. Generally, during the construction period of PPP project, a large amount of capital needs to be invested, and the main risks include financing, the quality of project construction and the safety precautions of project construction. Especially in the financing link, the interest and expenses incurred in the process of fund raising will be included in the capital cost, which will lead to a large loan repayment risk during the construction period of PPP project. When the PPP project enters the operation period, the income generated by the operation of the project can compensate part of the risk of early-stage loans. In this stage, the main risks are insufficient market demand, price fluctuation and high maintenance cost of related equipment. In the whole project construction of the last decade, policy risk and financial risk run through it.

#### **3.3. Different Subjects and Types of Risks**

PPP project participants include government departments, different industry institutions and financial intermediaries. Among them, the government is mainly responsible for initiating and supervising the whole implementation process of PPP project. If the social capital is not properly selected at the initial stage, and the project design and planning are not scientific and reasonable, it will directly lead to the failure of normal implementation of the project and achieve the expected results. For another major participant, social capital, there are political risks, market risks, construction and operation risks. Financial institutions mainly have the ability to recover project loans and interest on time. If the whole project cannot be completed on time or achieve the expected effect due to various reasons, it will seriously affect the financial institutions' fund recovery.

### **4. Principles for the Construction of PPP Project Risk Assessment System in the Context of New Urbanization**

#### **4.1. Integrity Principle**

In the construction of PPP project risk evaluation system, we should start from the overall situation, sort out the implicated relationship between various parts and links of the project and clear the main thread of the whole process of the project, so as to achieve accuracy, without omission and repetition.

#### **4.2. Phased Principle**

PPP projects are generally divided into pre planning, bidding stage; construction and operation stage of medium-term projects and later handover stage. Each stage faces different risks. In the construction of PPP project risk evaluation system, we should fully consider the characteristics of each index in stages and gradually, and establish scientific, comprehensive and effective preventive measures.

### 4.3. Principle of Hierarchy

PPP project risk evaluation indicators should be clear in primary and secondary, reflect the impact of various risk factors from shallow to deep, and clearly reflect the relationship and connotation of all levels from the perspective of quantification.

### 4.4. Feasibility Principle

Due to the diversity of risk types and different sources of PPP projects, the feasibility of risk assessment should be fully analyzed based on the characteristics of PPP projects.

## 5. Thoughts and Methods of PPP Project Risk Assessment

At present, there are many methods for PPP project risk evaluation in various research fields, including quantitative evaluation method and qualitative evaluation method. In the actual risk assessment process, generally, the risk identification and control should include: first, the importance of risk, through the analysis and judgment of the risks faced in each stage of PPP project, scientific and reasonable risk classification, and the determination of the boundaries of different risk ranges. The second is the level of risk possibility. It analyzes and judges the level of risk possibility of different risks. Thirdly, analyze the impact of each risk on the project and relevant participants, and determine the importance according to the actual impact.

At present, the main risk assessment methods of PPP project are hierarchical research method and decision tree method. AHP is mainly a multi criteria decision-making research method, its advantages lie in timely adjustment and improvement, its disadvantages are mainly reflected in the qualitative dominant position, quantitative data information is not reliable. Decision tree method is mainly to choose the best decision method with the help of probability and tree. Its advantages are that it can accurately and comprehensively analyze and judge the actual effects of various decisions, while its disadvantages are mainly reflected in the response and treatment of quantitative problems, the influence of subjective factors, unscientific and unreasonable decision-making, etc.

## 6. The Construction of PPP Project Risk Parity System Under the Background of New Urbanization

From the perspective of PPP project risk sources, it does not include natural risk, social risk, market risk, legal risk and so on. From the analysis of the impact scope of PPP project, there are overall risks and local risks. According to the participants, there are government risks, social capital risks, contractors and financial institutions risks.

According to the above characteristics of PPP project risk and the principles of PPP project risk assessment system construction, the framework of PPP project risk assessment system construction is finally determined.

### 6.1. First Level Evaluation Index

Combined with the risk characteristics of PPP project, the first level evaluation index mainly includes three levels: macro level, meso level and micro level.

### 6.2. Secondary Evaluation Index

Under each primary evaluation index, it is divided into specific secondary evaluation indexes. Among them, the macro level indicators are: political risk, market risk, natural risk and legal risk. Indicators belonging to the meso level include: financing risk, design and planning risk, construction risk, operation risk, transfer risk, etc. The micro level includes: coordination organization risk, cooperation relationship risk, third-party risk, etc.

### 6.3. Three Level Evaluation Index

Under the two-level indicators, three-level evaluation indicators are divided.see Table 1-3.

**Table 1.** Macro leve

Political risk	political instability risk, government intervention risk, government officials corruption risk, government decision-making error risk, government approval delay risk, etc
Market risk	interest rate risk, exchange rate risk, inflation risk, insufficient market demand risk, insufficient market revenue risk, market competition risk, etc
Natural risk	force majeure risk, address disaster risk, climate and environment change risk, etc
Legal risk	risk of imperfect legal and regulatory system, risk of legal change, risk of relevant policy change, risk of tax adjustment, etc

**Table 2.** Meso level

Financing risk	risk of feasibility of financing plan, risk of insufficient financing, risk of excessive financing cost, etc
Design planning risk	design feasibility risk, design scheme change risk, technical standard risk, etc
Construction risk	project approval delay risk, land acquisition risk, construction safety risk, project quality risk, contract change risk, financial allocation risk, etc
Operational risk	risk of over high operation and maintenance cost, low operation efficiency, insufficient operation revenue, operational security risk, etc
Transfer risk	residual value risk of the project, unsafe risk of transferred assets, etc

**Table 3.** Micro level

Partnership risk	organizational risk, financial risk, default risk, communication and coordination risk, etc
Third party risk	subcontractor reputation risk, supplier reliability risk, etc

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