Identifying Risk Response Measures for PPP Projects in China

Ye-Lin XU
Department of Engineering Management, Zhejiang Sci-Tech University,
Hangzhou, P.R.China
xuyelinhz@163.com

Keywords: Public–Private Partnership, Risk Factor, Risk Response, China.

Abstract. Public–Private Partnership (PPP) projects have received increasing attention over the last decade. Although numerous studies have been conducted in this area, only a few focused on exploring an objective and reliable risk response model for PPP projects. In this study, practical risk response measures for 16 risk factors of PPP projects were compiled and documented through a comprehensive literature review. The findings can provide good references for both government departments and private companies to cope with potential risks during implementing PPP in China.

Introduction

Public–private partnership (PPP) is “a co-operative venture between the government and the private sectors, built on the expertise of each partner, that best meets clearly defined public needs through the appropriate allocation of resources, risks and rewards” [1]. With rapid urbanization in China, various urban infrastructure projects with significantly increased value have been successfully developed through the PPP model [2-6]. China has implemented approximately 1000 PPP projects, whose total value reached 900 billion RMB in 2015. The Chinese PPP projects concentrate on transportation, telecommunications, energy, and water use [7].

The government has shown considerable interest in adopting Public–Private Partnership (PPP), but the system has experienced a series of huge impediments in its implementation because of (1) imperfect political and legal systems; (2) unfavorable economic and commercial conditions; (3) inefficient public procurement framework; and (4) a lack of mature financial engineering techniques [8]. To avoid difficulties and impracticalities during the execution phase of a PPP project, special attention must be paid to risk management. Early studies indicate that the success of PPP projects is greatly dependent on the extent that the risks involved can be properly identified, understood, allocated, and responded to [1]. PPP projects require a specific and comprehensive risk response model to match with risk management so that the project can operate smoothly and efficiently. However, few studies have been conducted to identify the risk response measures for PPP projects in China. Therefore, it remains unknown how to effectively cope with the risk issues during implementing PPP projects, which further presents barriers for promoting PPP in China. This study aims to identify potential response measures for Risk Factors (RFs) of PPP projects. The findings can provide useful references for private companies to better implement PPP projects in China.

Research Method

In order to realize the research objective, this study follows the analytical process demonstrated through Figure 1. Firstly, literature review is conducted to find the preliminary response measures for RFs associated with PPP Projects in China. Qualified journals and databases including Web of Science, Elsevier, and Engineering Village are searched with keywords “PPP” and “risk response”. Irrelevant journal papers with risk response are excluded for further analysis. All measures are recorded for analysis in the second step. Secondly, content analysis is conducted to classify response measures into four strategy groups, namely, (a) risk transfer measures, (b) risk reduction measures, (c) risk avoidance measures, and (d) risk retention measures based on the above findings. Similar
measures are combined as one in this step. Thirdly, expert interview is conducted to validate the classified risk response measures. Thorough discussions are conducted.

**Research method**

**Step 1**

**Identify preliminary risk response measures**

**Step 2**

**Classify risk response measures**

**Step 3**

**Validate the risk response measures**

Figure 1. The research process of this study.

**Risk Response Measures**

A series of risk response measures for RFs associated with PPP projects in China was determined through a literature review. Qualified journals and databases including Web of Science, Elsevier, and Engineering Village are searched with keywords “PPP” and “risk response”. Irrelevant journal papers with risk response are excluded for further analysis. Based on the [8-14], this study derives the response measures for RFs associated with PPP projects in China. This list provides concessionaires with a reference to select appropriate risk response measures based on their resources and risk management capability (as shown in Table 1).

<table>
<thead>
<tr>
<th>Political risk</th>
<th>Government corruption/Government intervention/ Nationalization/Public credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Conduct political risk and government credit assessments before investment by collecting relative information or consigning risk evaluation agencies.</td>
<td></td>
</tr>
<tr>
<td>(2) Obtain the government’s written credit support to prevent government intervention and expropriation. If the political risk is unavoidable, the government should compensate the project company based on the market price.</td>
<td></td>
</tr>
<tr>
<td>(3) Work directly with businesses and bypass brokers or middlemen.</td>
<td></td>
</tr>
<tr>
<td>(4) Define rights and obligations clearly between the government and the project company in the concession agreement.</td>
<td></td>
</tr>
<tr>
<td>(5) Allocate stock rights. Establish a consortium with a local renowned private enterprise, state-owned enterprise, international corporation, or local government agency. If an influential company becomes a share-holding participant, the risk of forcible procurement, government intervention, or nationalization risk will be greatly reduced.</td>
<td></td>
</tr>
<tr>
<td>(6) Allocate creditor’s right. If several banks form a syndicate, participate in the PPP project financing, and offer a parallel loan, the risk will be greatly reduced. This step is much better than merely borrowing from one lending institution.</td>
<td></td>
</tr>
<tr>
<td>(7) Obtain all requisite documents and government approvals in time to avoid officer corruption and undue intervention.</td>
<td></td>
</tr>
<tr>
<td>(8) Obtain support from a foreign firm’s host government or international monetary institutions, such as World Bank and Asia Development Bank, to combat the misuse of</td>
<td></td>
</tr>
</tbody>
</table>
power by the local government or its agencies.
(9) Develop and maintain good connections and relations with concerned local government officials (especially top officials) and concerned authorities.
(10) Obtain insurance for political risk from international finance institutions or international risk assessment agencies.
(11) Obtain guarantees or other credit support from reliable and credit-worthy local and international entities.
(12) Transfer risk to the local government via reasonable compensation clauses such as tariff adjustment or concession period extension.
(13) Establish exigency response plans for political risks.
(14) Set aside a risk budget for undue and unavoidable government action and train employees to deal with local officials’ corruption and undue intervention.

<table>
<thead>
<tr>
<th>Macro economic risk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foreign exchange risk</strong></td>
</tr>
<tr>
<td>(1) Conduct a market investigation on foreign exchange to forecast the market trend.</td>
</tr>
<tr>
<td>(2) Obtain local government guarantees on exchange rate and convertibility, e.g., fixed rate for a long time period or use dual-currency contracts with a certain portion to be paid in a specific currency and the remaining balance in the local currency.</td>
</tr>
<tr>
<td>(3) Obtain substantive preferential benefits from the government in terms of land, concession period, tax, foreign exchange, raw material purchase, market supplies, and marketing channel.</td>
</tr>
<tr>
<td>(4) Use financial tools such as currency option contract, foreign exchange swap, future exchange contract, and forward exchange contract to alleviate the foreign exchange risk.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inflation rate volatility</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Grasp the price fluctuation tendency of the international market through a comprehensive analysis of the price level of project, international material, equipment, and scope of local currency’s depreciation.</td>
</tr>
<tr>
<td>(2) Incorporate price fluctuation terms into a long-term purchase agreement (take-or-pay contract), i.e., increase the charge or extend the concession period corresponding to the actual inflation rate.</td>
</tr>
<tr>
<td>(3) Set aside a risk budget as standby funding to combat unpredictable risk.</td>
</tr>
<tr>
<td>(4) Obtain financial support or financial guarantee from a reputable bank or monetary institution.</td>
</tr>
<tr>
<td>(5) Transfer risk to the local government via government guarantee clause, compensation clause, or tariff and concession period adjustment clause. Or obtain preferential benefits from the government in aspects of land acquisition and tax reduction.</td>
</tr>
<tr>
<td>(6) Sign a general contract with the construction contractor or operation contractor.</td>
</tr>
<tr>
<td>(7) Sign a fixed price supply contract with equipment and raw material suppliers.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interest rate volatility</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Grasp the interest rate fluctuation tendency of international and local markets through an analysis of the macro economy.</td>
</tr>
<tr>
<td>(2) Incorporate interest rate fluctuation terms into a long-term purchase agreement (take-or-pay contract), i.e., increase the charge or extend the concession period corresponding to the actual inflation rate.</td>
</tr>
<tr>
<td>(3) Set aside a risk budget as standby funding to combat interest rate volatility.</td>
</tr>
<tr>
<td>(4) Obtain financial support or financial guarantee from a reputable bank or monetary institution.</td>
</tr>
<tr>
<td>(5) Transfer interest rate risk to the local government via government guarantee clause, compensation clause, or tariff and concession period adjustment clause. Or obtain...</td>
</tr>
</tbody>
</table>
substantive preferential benefits from the government in aspects of land acquisition and tax reduction.

(6) Sign a general contract with construction contractor or operation contractor.

(7) Sign a fixed price supply contract with equipment and raw material suppliers.

---

Law risk

Imperfect legal and supervision system / Legislative change

(1) Scrutinize the legal risk with a legal consultant in the feasibility study stage of PPP projects to ensure that the project design, financing, and tax affairs meet legal requirements of the local government.

(2) Understand how the current local laws and regulations interact.

(3) Sign a guarantee agreement, which includes import restriction clause, service clause, lawsuit exemption clause, arbitral clause, and development clause, with the government with the help of a legal consultant.

(4) Designate foreign law as the criterion law and foreign court as the ruling court in concession agreement (for foreign investment).

(5) Insure political risk, which includes some of the legal change risks (some political insurance is offered by the Multilateral Investment Guarantee Agency).

(6) Transfer law risks to the local government via government guarantee clause, compensation clause, or tariff and concession period adjustment clause.

(7) Obtain preferential benefits from the government in aspects of land acquisition and tax reduction to compensate the loss from legislative change risk, which is usually assumed by the government.

(7) Develop and maintain good connections and relations with concerned local government officials (especially top officials) and authorities.

(8) Establish a consortium with local renowned private enterprise, state-owned enterprise, international corporation or government agencies, or directly invite the government to participate.

(9) According to industry rules, if the project company is unable to fulfill its obligations because of legal changes that meet the conditions of a force majeure, the project company has the right to discontinue its obligations. However, the government still needs to pay the project company based on the payment clause.

---

Construction risk

Completion risk

(1) Select contractors with good credit and advanced technology to undertake design and construction tasks.

(2) Sign a general contract with fixed price and definite data for “turnkey,” and transfer completion risk to general contractor.

(3) Request the contractor to provide the performance security sum and incorporate liquidated damage clauses into the agreement.

(4) Obtain shareholders’ pledge to increase the capital input or loan in solving problems that the project company may face.

Material/labor unavailability

(1) Select familiar material/labor suppliers with good credit.

(2) For special resources, obtain provision guarantee from the government. Insufficient supply from government provision should be regarded as a force majeure event.

(3) Sign long-term energy and raw material supply contract with suppliers.

(4) Adopt domestic materials as much as possible.

(5) Establish a supply and reserve system if the long-term supply contract cannot be obtained.
Unproven engineering techniques
(1) Scrutinize the design documents carefully to avoid technological risks caused by excessive innovation.
(2) Select advanced production technology, equipment, and working routine that match with the market situation.
(3) Select an experienced contactor and operator with mature technology and transfer risks to the contractor through a performance guarantee.
(4) Purchase commercial insurance or sign a technology guarantee contract.
(5) Maintain and replace equipment strictly according to the service plan to ensure that equipment works normally.
(6) Execute strict production management and staff technical training.

Unforeseen weather/Geotechnical conditions
(1) Precautionary measures—scrutinize circumstantial conditions such as geological condition and climate to identify natural hazards.
(2) Establish an exigency response program and set aside a risk budget for emergencies.

Operation risk
Operation cost overrun
(1) Select operation contractors with good credit and abundant industrial experiences to undertake the operation tasks.
(2) Sign an operation contract with fixed production cost and transfer operation cost overrun risk to the operation contractor.
(3) Request the operator to provide the performance security sum and incorporate liquidated damage clauses into the operation agreement.
(4) Obtain shareholders’ pledge to increase the capital inputs or loans in solving problems that arise from operation cost overrun.
(5) Insure for third party liability, force majeure risk, commercial insurance, and so on.
(6) Sign a fixed or pre-determined price contract with material and accessory facility suppliers.
(7) Develop a proper quality/safety/cost/schedule control management system and execute it accordingly.

Price change (price compensation)
(1) Conduct a market investigation and forecast the market demand and price.
(2) Define a price adjustment formula in the purchase agreement.
(3) Sign a take-or-pay contract with the government to ensure that the operation and maintenance cost can be paid on time.
(4) Obtain a product purchase guarantee to ensure that the difference between a project’s actual income and expected income will be subsidized by the government.
(5) Obtain competition protection (the government’s guarantee that no other competitive project will be built) from the local government. Or under the same condition, concessionaire has the priority to obtain the right of construction and operation of similar projects.
(6) Obtain preferential benefits from the government to combat price risks such as the development right of nearby facilities and tax.
(7) Develop and maintain good connections and relations with concerned local government officials (especially top officials) and authorities.

Expense payment risk
(1) The private sector should ensure the rationality of profit and refuse to obtain excess
(2) Develop and maintain good relationships with officers.
(3) Ensure service supply quality.
(4) Obtain a guarantee letter or a consolatory letter from the higher-level government.

Note: Response measures for political risk and legal risk are grouped together, as nearly all the measures that can be used to combat each of the risk factors belong to their respective group.

Classification of Response Measures

To obtain a clear image of risk response measures for PPP projects, content analysis was further adopted to classify response measures into four strategy groups, namely, (a) risk transfer measures, (b) risk reduction measures, (c) risk avoidance measures, and (d) risk retention measures based on the above findings. The process of conducting content analysis in this study consists of listing all response measures, assembling similar main points and means, and crystallizing different main themes.

Table 2. Simplified response measure list.

<table>
<thead>
<tr>
<th>A. Risk transfer measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Transfer risks to the local government via government guarantee clause, compensation clause, or tariff and concession period adjustment clause (for example, competition protection policy, import restriction agreement, service agreement, lawsuit exemption agreement, arbitral agreement, and development agreement).</td>
</tr>
<tr>
<td>2) Sign a long-term purchase agreement with the government (i.e., take-or-pay contract) and obtain a price guarantee of the product or service from the government.</td>
</tr>
<tr>
<td>3) Obtain substantive preferential benefits from the government in aspects of land purchase, tax reduction, foreign exchange, raw material purchase, and so on.</td>
</tr>
<tr>
<td>4) Sign a general contract with fixed price and definite date for “turnkey” to transfer completion risks to the general contractor. Request the contractor to provide the performance security sum and incorporate liquidated damage clauses into the general contract.</td>
</tr>
<tr>
<td>5) Sign a fixed price supply contract with equipment and raw material suppliers.</td>
</tr>
<tr>
<td>6) Sign a technology guarantee contract with suppliers.</td>
</tr>
<tr>
<td>7) Insure for risks including political risk, third party liability risk, and commercial risk.</td>
</tr>
<tr>
<td>8) Establish a consortium with local renowned private enterprises, state-owned enterprises, international corporations, and/or government agencies.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B. Risk reduction measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Obtain support from foreign firm’s host government or international monetary institutions, such as World Bank or Asia Development Bank, to prevent the misuse of power by the local government or its agencies.</td>
</tr>
<tr>
<td>2) Adopt alternatives to contract payment, such as land development rights and resource exchange.</td>
</tr>
<tr>
<td>3) Utilize domestic material/labor as much as possible and minimize construction and operation costs.</td>
</tr>
<tr>
<td>4) Develop and maintain good connections and relations with concerned local government officials (especially top officials) and authorities.</td>
</tr>
<tr>
<td>5) Obtain a guarantee letter or a consolatory letter from the upper-level government.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C. Risk avoidance measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Precautionary measures – conduct an investigation to evade environmental risks. Scrutinize the market environment conditions, such as domestic and foreign market tendency, price fluctuation tendency, international material and equipment market,</td>
</tr>
</tbody>
</table>

74
local currency’s depreciation, geological condition, and climate.

2) Scrutinize related documents to avoid design risk, law risk, and safety risk with consultation from a local project consultant.

3) Define authority and responsibility in the concession agreement and clarify guarantee clauses with the government to prevent government corruption, intervention, expropriation, and public credit risk.

4) The project company maintains and replaces equipment strictly according to the service plan to ensure that the project or equipment works normally.

### D. Risk retention measures

1) Develop a clear and appropriate plan for effective risk control, such as quality, safety, cost, and schedule control management systems.

2) Establish an exigency response program and set aside a risk budget for emergencies.

3) Train employees to deal with corruption and undue intervention from local officials.

4) Obtain shareholders’ pledge to increase the capital input or loan to solve any problems that the project company may face.

---

Interview with five experts from government departments, private companies, and participating in PPP projects in China was conducted to validate the identified risk response measures[15]. It was found that the experts agree that the identified risk response measures are useful for both local governments and private companies in coping with risk embedded in PPP projects. Among these measures, risk avoidance is set as the highest priority. The stakeholders of PPP projects should make precautionary measures, scrutinize relevant documents, and clearly define authority and responsibility to avoid unclearness happening after implementing PPP projects. Risk reduction is set as the second highest priority. The stakeholders must adopt various measures including obtaining supports from the host government, utilize local labors and materials as much as possible, maintaining a good relationship between local governments, and obtaining guarantee from upper-level government. These measures are useful to reduce potential risks in implementing PPP projects as extra measures can hedge some potential risks. Risk transfer is the third highest priority. If some risks cannot be avoided or reduced, the private companies can take certain measures to transfer the risk to other parts, e.g. signing a long-term purchase contract. With a clear contract, some risks can be transferred and shared with other stakeholders when implementing PPP projects. Risk retention is the last priority. For certain risks that cannot be transferred and avoided, planning and exigency response program should be made in advance to better cope with them.

### Conclusions

Risk management is essential to the success of PPP projects. In this study, 16 critical risks associated with PPP projects in China were selected and categorized into five risk groups, namely, political risk, macroeconomic risk, legal risk, construction risk, and operation risk. For each of the identified risks, practical risk response measures were provided. To obtain a clear image for risk response measures, content analysis was employed to classify response measures into four strategies, namely, risk transfer, risk reduction, risk avoidance, and risk retention. They provide concessionaires with a reference for selecting appropriate response measures based on their resources and risk management capability. The research findings lay a foundation for systematic risk response planning and control in a booming Chinese PPP industry and can also be used to guide future related studies.

### Acknowledgement

The work described in this paper was supported by the Humanities and Social Sciences Project of Universities in Zhejiang Province (14056133-F/2013QN007).
References


