Risk Allocation in Public Private Partnership Projects in Kerala

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Abstract - *This paper aims first to identify the preferred risk allocation and to evaluate these risks. First the paper reviews the current literature to identify common risks in PPP infrastructure project and classification methods used. We considered about 23 risk factors and conducted survey from different firms. Public private partnership (PPP) projects are a contractual agreement between a public agency and a private sector entity for sharing skills and assets for delivering a facility for the use of general public. A questionnaire survey was conducted and responses where used to conduct a statistical analysis using SPSS software and find out significant risks involved in PPP projects in Kerala. Analysis was carried out and risk factors were ranked and we came to the conclusion that the major and significant risks were land acquisition, political corruption and opposition, unforeseen weather.*

*Key Words***:** *Public private partnership (PPP), Risk assessment, Risk allocation.*

1. INTRODUCTION

1.1 General

PPP can be defined as a long term relationship between the public and private sectors that has the purpose of producing public services or infrastructure (Cartlidge, 2006). The partnerships between the government and private sectors have been seen as useful to overcome the resource deficit experienced by governments.

PPP projects may take different forms such as Build Operate Transfer (BOT), Build Own Operate Transfer (BOOT), Leasing, Join Ventures or Operation and Management contracts. However, due to the long concession period and large amount of investment, the risks associated with PPP projects should not be underestimated. Generally, risk management includes: risk identification, risk assessment and risk response. Identification, assessment and allocation of risk factors are important for equitable risk distribution between public sector and private sector. Even though PPP model is being practiced in Kerala risk factors associated with PPP

in Kerala has not yet been studied. Risk factors vary with the nature of projects. This project intends to identify, assess and allocate equitably between public and private sector. Public Private Partnership (PPP) bring private and public sectors together in long-term contracts to produce a required infrastructure like roads, airports, water systems, hospitals etc.

In PPP a private entity, usually a consortium responsible for financing, design, construction, operation and maintenance of the facility for agreed duration known as concession period and at the end of the period transfers the ownership of the operational facility to the government at no cost. In return, the private entity generates revenue either from the levying of tariffs on users or the receipt of periodic service payments from the government over the life of the BOT agreement.

1.2 Objectives of the study

A. To identify the risk factor
B. To assess the risk factor
C. To allocate the risk factors

1.3 Scope of the study

Identification, assessment and allocation of risk factor involved in public private partnership projects in Kerala.

2. RESEARCH METHODOLOGY

A questionnaire survey was carried out with various public sector and private sector professionals to find out the significant risk factors that affect the performance of various PPP projects in Kerala. 23 Risk factors were identified from extensive literature review of various journals related to PPP.

The questionnaire consisted of three parts. First part collected demographic information of respondents. In second and third part the respondents were asked to rate the risk factors based on their probability of occurrence and severity of impact Five Point Likert scale, 1-very low, 2-low, 3-average, 4 -high, 5-very high. Data obtained was then analysed using Statistical

package for social sciences software (SPSS) for reliability, relative importance and risk significance.

2.1 Steps involved in questionnaire design

1. Identify what to cover in questionnaire or identifying what to include and what not to. Clarity of topic is of most importance while designing questionnaire.
2. Words and phrases used in the questionnaire should be easy to comprehend for all types of
respondents. If they don't understand the meaning they probably end up giving the wrong data.
3. Flexible in options as sometimes the respondent don't want to choose the given options so in such a cases go for the "other" option.
4. Choose between open ended question and closed ended question and it should be properly sorted out.
5. Prepare a rough draft because it would be helpful in revising the questionnaire and help fix the right order of questions.

2.2 Risk factors considered

1. Land acquisition
2. Communication between stakeholders
3. Issues in subcontracting
4. Revenue generation
5. Legal disputes between stakeholders
6. Experience level of the contractors
7. Interest rate fluctuations
8. Third party availability
9. Availability of finance
10. Foreign exchange rate fluctuations
11. Legal risk
12. Accidents during construction/operation
13. Delay in planned activities
14. Errors in construction
15. Design deficiency
16. Political uncertainties
17. Red tapism and corruption
18. Delay in project approvals
19. Import or export restrictions
20. Duration of project
21. Debt servicing risk
22. Changes in tax regulation
23. Other unforeseen factors

3. TESTS AND RESULTS

3.1 Reliability Analysis

Cronbach's alpha value for risk factor ratings of both Probability and Severity were conducted. Cronbach's alpha is the measure of reliability of Data. Cronbach's alpha for

both Probability and Severity were greater than 0.7. Reliability analysis was carried out using SPSS software.

3.2 Relative Importance Index

RII is calculated to find out the relative significance of risk factors. RII test was carried out for both Probability and Severity criteria.
RII= $W/A*N$

3.3 Risk Significance

Risk significance is used to rank risk factors based on total effect it has on the project.
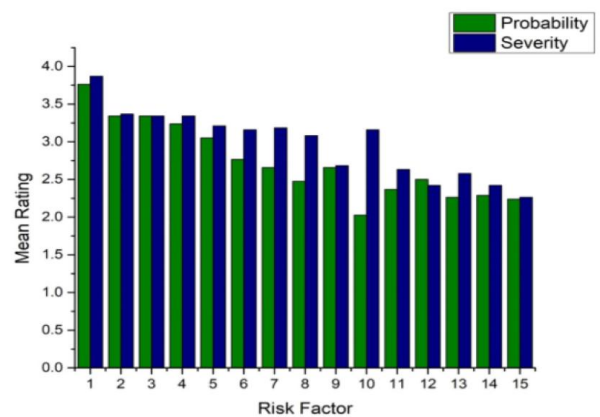Risk Significance = Risk Probability X Risk Impact

Figure 1: Mean writing of risk factors based on probability and severity

3.4 Mann Whiteney U Test

It is a non-parametric statistical test which is used to find out if the is any significance difference between samples taken from a same population and test whether mean of sample same or different to find out if there is a difference between the perception of private sector and private sector.

3.5 Risk Allocation

Risk allocation is done on the basic of a formula which is used to calculate the ranges within which the risks should be allocated
$X_{(10\%=)}$ $U\pm Z*\sigma$
$X_{(10\%=)}$ Values of upper and lower limits within which the risk should be allocated to a specific party
U= Mean value of population
Z= corresponding Z value as computed from the normal curve table
σ = Population standard deviation

Table 1: Ranking of risk factors based on risk significance

Rank	Risk Factor	Risk Probability	Risk Severity	Risk Significance
1	Land Acquisition	3.7531	3.8773	14.61
2	Red tapism and corruption	3.3421	3.3684	11.26
3	Other unforeseen factors	3.3401	3.3481	11.18
4	Delay in project approvals	3.3387	3.3453	11.16
5	Foreign exchange rate fluctuations	3.2368	3.3421	10.82
6	Political uncertainties	2.7632	3.1579	8.73
7	Debt servicing risk	2.6579	3.1842	8.46
8	Third party availability	2.4737	3.0789	7.62
9	Duration of project	2.6579	2.6842	7.13
10	Legal disputes between stakeholders	2.3684	2.6316	6.23
11	Communication between stakeholders	2.500	2.4211	6.05
12	Accidents during construction/operation	2.2632	2.5789	5.84
13	Errors in construction	2.2895	2.4211	5.54
14	Availability of finance	3.2895	1.5263	5.02
15	Delay in planned activities	1.7568	2.6316	4.57
16	Legal risk	1.500	2.6053	3.91
17	Design deficiency	1.7895	2.0263	3.63
18	Issues in subcontracting	1.4737	2.3158	3.41
19	Interest rate fluctuations	1.5526	1.6842	2.61
20	Experience level of the contractors	1.6579	1.3421	2.23
21	Changes in tax regulation	1.5789	1.3421	2.12
22	Revenue generation	1.3421	1.3421	1.80
23	Import or export restrictions	1.2632	1.3947	1.76

4. CONCLUSIONS

Risk allocation in PPPs is straight forward in principle—risks must be allocated to the party best able to manage them (at the lowest cost)—but challenging in implementation. Generic applications of this principle have resulted in more or less standardized notions of how risks should be allocated between public and private parties. Effective risk allocation requires creative and innovative thinking, customized to the unique characteristics of the project.

It also requires additional guiding principles, including considering which party has the greatest incentives to undertake preventative risk management and to minimize the financial consequences of a risk. Partially transferring risks that are typically fully retained by the public sector may also create incentives for the private party to opt for more cost-efficient solutions. An effective risk management plan should have a valid risk assessment model made suitable to local scenario. The research findings revealed that land acquisition is the most significant risk factor in the PPP projects in Kerala.

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