

Risk: Awareness, Identification and Mitigation in PPP Projects

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Abstract : *Public Private Partnerships have emerged as one of the latest and successful means for building and rebuilding infra structure framework in developed and developing countries. Shortage of funds and associated constraints has given rise to PPP model. There are various phases in development of PPP projects in which different risks come into play. Due to the risks PPP projects are always subjected to probability of failure. In PPP projects, risk management plays a crucial role. Risk management is handling risks involved in a project, which is an ongoing process that continues throughout the life cycle of the concession period of PPP project. This study is focused on survey methodology in order to check the awareness and knowledge regarding risk management through which an attempt is made to formulate criticality of risks. In this paper different types of project risks will be identified. Attempt to prepare general framework for risk management which include identification of risk events and finally risk mitigation measures will be done. Based on the survey results, the Collection risk, Political risk, and Construction risk are most critical. Risk mitigating measures are drafted to these critical risks and a risk management framework for PPP models is proposed.*

Keywords: *Public Private Partnerships, Water Supply Systems, Risk, Risk Management, Risk Mitigation.*

1. Introduction:

Risk in PPP models is inevitable and is a combination of uncertain events and its consequences. A positive consequence presents an opportunity; a negative consequence poses a threat. The definition of risk is, "The chance of certain occurrences adversely affecting project objectives, typically: scope, quality, time and cost. A risk is an event which is uncertain and has a negative impact on some endeavour. The process of risk identification, allocation and mitigation of risks is called risk management. This research paper is focussed on survey methodology in order to check the awareness and knowledge regarding risk management for successful execution of PPP projects. An attempt is made to carry out survey from which criticality of risks associated with PPP projects are formulated. Based on the survey, risk mitigating measures are drafted to these critical risks. Finally from the survey results and analysis a risk management framework for PPP models is proposed.

2. Survey Methodology :

In this study an empirical survey to collect feedback from concerned officials connected to PPP were taken, to study various aspects of risk management. A series of structured interviews were conducting, targeting managers with their prior permission, having experience in PPP projects. The questionnaire was selected as a

basis for the structured interviews as presented in this report. A total of 18 different companies agreed to be interviewed after much persuasion and follow-up calls. The interviewees are senior or middle level managers in their companies. Out of them more than 18 interviewees have more than 10 years working experience. All these respondents participating in this survey have rich experience in PPP projects and therefore their views would be useful for further analysis.

3. Survey Organization and Design:

A suitable questionnaire was prepared for the survey. The questionnaire was sent through mail to the concerned authorities of various companies. Some authorities replied back but a few authorities did not reply back.

3.1 One on One Questionnaire Survey:

The survey was conducted by meeting the concerned authorities personally. They were interviewed as per the questionnaire. There are four parts of the questionnaire, in which total 20 questions along with a tabular analysis were asked for analysis.

3.2 Questionnaire Survey by E-mail:

A survey was conducted by sending e-mail's to e-mail addresses of various industry persons including clients, contractors, subcontractors and project management consultants. Some respondents skipped some questions as they may not have understood some questions.

4 Data Analysis:

From the survey one fact is revealed that the knowledge regarding risk management is at a preliminary stage. Some of them are aware about risk management concept but do not know the details regarding the same. The respondents were selected because they have worked for the PPP projects. Among the received respondents eighteen are complete and valid.

The response showed that several respondents have heard about risk management but do not have any type of systematic knowledge and training regarding the same.

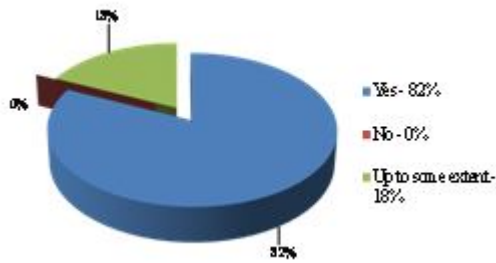
The findings show that the advanced software's or trainings from professional risk management training institutes should be imparted which will change the approach towards the conventional methods and improve the success rate of PPP projects.

The data is further reviewed and converted into graphical form, so it becomes easy to understand the findings and analysis.

4.1 Awareness of risk management :

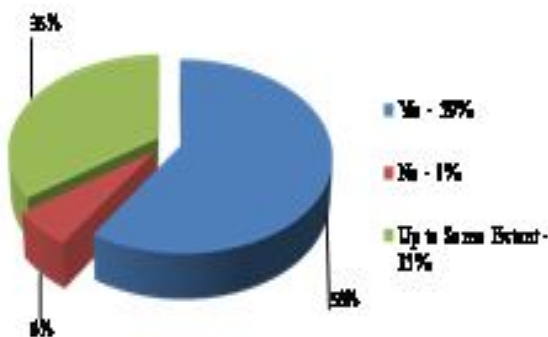
Graph-4.1.1 shows the percentage of awareness of risk management concept. The percentage of awareness is good.

There wasn't anyone who didn't know about risk management.



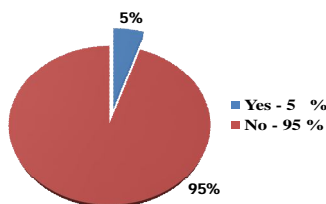
Graph-4.1.1 Awareness of risk management

Graph-4.1.2 shows the percentage of people having personal knowledge of risk management. Almost 59% people have personal knowledge of risk management, and up to 35% have knowledge of risk management up to some extent. Further analysis shows that many of these 59% have only heard about risk management and do not have scientific knowledge nor they have taken specific training.



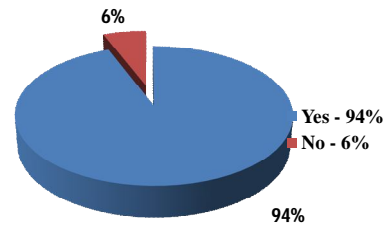
Graph 4.1.2 People having personal knowledge of risk management

Graph-4.1.3 shows the percentage of people those who have taken training in risk management. This shows that only 5% people have taken training in risk management and rest 95% have only heard about risk management and are aware about the concept.



Graph 4.1.3 Training in Risk Management

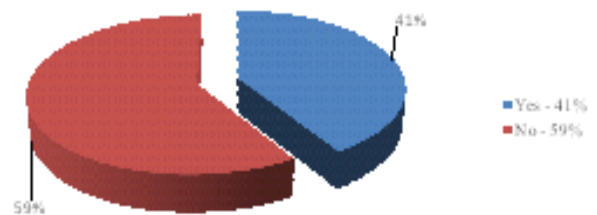
Graph-4.1.4 shows the percentage of persons having knowledge of various types of risks. It can be seen that 94% of them know about the various types of risks which come into picture. All the interviewees agreed that the risks specified in the questionnaire were appropriate.



Graph-4.1.4 Know Various Types of Risk]

Graph-4.1.5 In this graph it can be seen that even though awareness of types of risks is their, only 41% of them know about the methods of calculating risk and rest 59% are totally unaware of these methods.

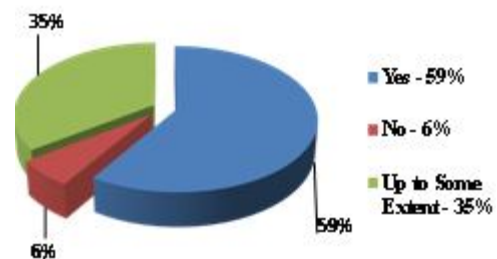
Awareness of Methods of Calculating Risks



Graph 4.1.5 Awareness of methods of Calculating Risks

4.2 Risk management in organizational use :

Graph-4.2.1 shows the percentage having personal knowledge of risk management in which 59% have it, while 35% have this knowledge up to some extent while 6% of them don't have it at all.



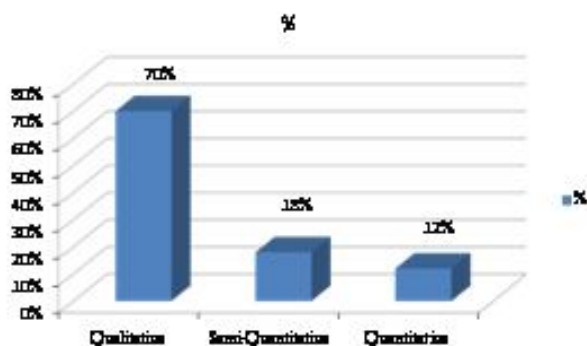
Graph 4.2.1 Personal Knowledge of Risk Management

Graph 4.2.2 shows the percentage use of computers in risk management in comparison with other applications. This graph shows that use of computers in risk management is very less i.e. up to 30%.



Graph 4.2.2 Use of Computers

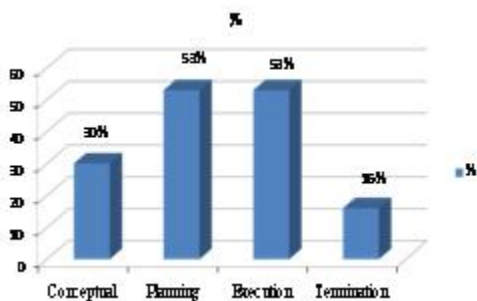
Graph 4.2.3 shows which risk analysis methods are used in risk management. The maximum method used is Qualitative analysis which shows a percentage of 70% usage, followed by Semi-Quantitative method with 18% and Quantitative method with 12%.



Graph 4.2.3 Use of Risk Analysis Methods

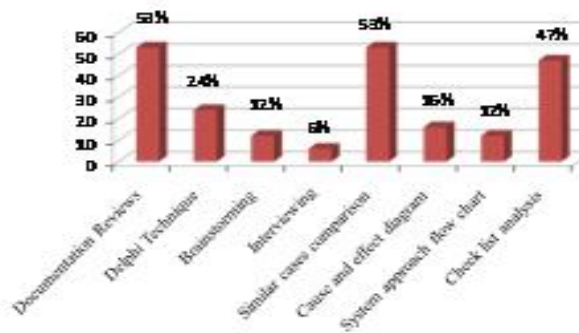
4.3 Risk management usage in project lifecycle :

Graph 4.3.1 shows the risk management usage in project life cycle phase which shows that risk management usage is maximum in the planning and execution phase which is 53%, and it is lesser at conceptual and termination phase which is 30% and 16%.



Graph 4.3.1 Risk management Usage in Project Life Cycle Phase

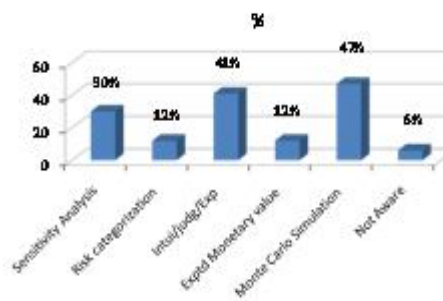
Graph 4.3.2 shows the percentage usage of different risk identification tools. The documentation reviews with 53% and similar cases comparison also at 53 % is used as a tool for risk management and checklist analysis is used after that with 47%.



Graph 4.3.2 Use of Risk identification Tools

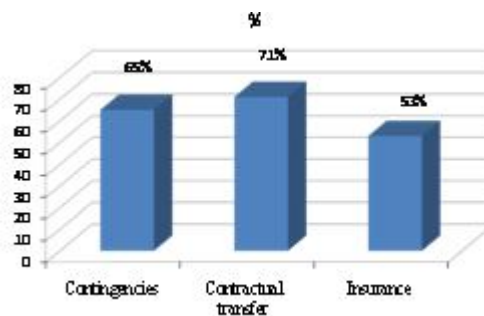
4.4 Risk analysis techniques and factors preventing their implementation:

Graph 4.4.1 shows the percentage of risk analysis technique frequently used. Following graph shows that Monte Carlo simulation technique is used most frequently with 47% and intuition, judgment and experience for 41 %.



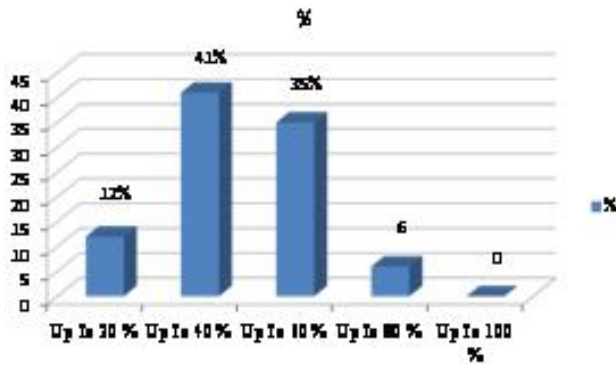
Graph 4.4.1 Risk Analysis Techniques Used

Graph 4.4.2 shows that the mostly used risk response technique is contractual transfer which is 71 %. Next to it is contingencies which are used for 65%.



Graph 4.4.2 Risk Response Technique Used

Graph 4.4.3 shows that the 41% risk is recorded in the risk management database up to 40 %, and 35% upto 60%. It shows that the frequency of recording risk in risk management database is less.



Graph 4.4.3 Frequency of Recording Risk in a Risk Management Database

5 Criticality of Risks:

The survey results concerning the criticality of risks associated with urban water supply PPP projects are tabulated in Table 5.1. The risks are ranked from 1 to 9 on the basis of their scores. The risk with the highest score would be ranked 1 and so on.

Table: 5.1 Criticality of Risks in PPP projects.

Critical Risk	No. of Respondents who answered						Ranking
	Not Applicable	Not At All Critical	Only Slightly Critical	Critical	Very Critical	Very much Critical	
Collection Risk	0	0	2	4	9	3	1
Political Risk	0	0	3	7	6	2	2
Construction (Cost and time)	0	0	3	7	6	2	2
O&M	0	1	2	9	4	2	2
Tariff Risk	1	1	1	6	6	3	2
Investment /Cash Flow Risk	0	0	4	11	3	0	3
Contractual Risk	0	4	3	6	4	1	4
Financial Risk(Exchange rate)	4	0	5	6	2	1	5
Technical Risk	0	6	10	2	0	0	6

6 Risk mitigating measures:

During the survey it was also asked the respondents regarding the available mitigating measures for the critical risks associated with PPP projects. Some mitigating measures were also developed from the literature review. Following table no: 5.1 shows most effective mitigating measures.

Table 6.1: Mitigating measures for critical risk.

Sr no.	Risk	Mitigating measures
1	Collection Risk	To convince the common people through the local leaders regarding the future benefits of the project. Set up a

		help desk for people who have doubts regarding the project and counsel them for economical use of water so the monthly bill can be less. Apply the slab system for billing.
2	Political Risk	Maintain good rapport with local political leaders and convince them regarding the benefits of the project to common people, and how it can be a win-win situation for both of them.
3	Construction (Cost & time overrun)	Contracts with the project participants.E.g:contractors, input suppliers, and the operator. To keep stand-by loan or stand-by capital. The lenders can also be asked to provide standby credit facilities for cost overruns.
4	Operation & Maintenance	Clear output specifications should be there. Penalty regime and performance monitoring to be done. Adequate O & M contract with substitution rights. Special insurance and special security in form of final maintenance bonds.

7 Risk management framework:

Based on the survey results and analysis, a risk management framework for PPP models can be proposed as follows.

Step 1: List all risks associated with the proposed PPP project and then analyze these risks in order of importance. The more critical risk, the more attention should be paid to it.

Step 2: For each risk, list corresponding mitigation measures as more as possible, and then examine the availability of mitigating measures in sequence based on their effectiveness. The more effective the measure, the higher the priority for adoption. Sometimes, a combination of several mitigating measures is needed to be adopted.

Step 3: For each risk and its mitigating measures, negotiate with Indian government and related entities to incorporate the risk mitigating measures, and fine tune the concession agreement and other agreements as much as possible to ensure that all of these risks are adequately covered.

Step 4: Allocate risks to related parties according to the principle that risk should be borne by the party most capable of controlling it. An optimal allocation of risks depends on the relative bargaining power of the parties and the potentiality of reward for taking the risks.

Step 5: Adopt the risk allocation and security structure and enter into financing process for the project.

Conclusion:

The findings show that there is need for awareness and knowledge of risk management. The implementation of methods of risk analysis has to be done still more effectively. Advanced software's or trainings from professional risk management training institutes should be imparted which will help to identify and mitigate. Systematic training of the concept of risk management and implementation of it will definitely help in successful completion of PPP projects.

In this paper an attempt is also made to investigate the critical risks and their mitigation measures for, associated with PPP models. The most of the measures have been formulated through the

interaction with the respondents and most of the measures seem to be effective to some degree.

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