

CHAPTER 8

CONCLUSION AND FUTURE SCOPE

8.1 CONCLUSION AND FUTURE SCOPE OF WORK.

The present study has been made to suggest and develop some tools which will eventually be useful to the governments, financial institutions, owners and/or contractors for timely completion of large infrastructure projects at reasonable cost and of a specified quality. PPP projects are targeting towards financing, designing, implementing and operating infrastructure facilities and services that were traditionally provided by the public sector. The government of India is leading the process of promoting PPP projects in India to create a success story. However, the overall financing gaps in infrastructure are quite high as per the estimates of planning commission of India. The investment needs for infrastructure is enormous. India faces a very large financing gap which needs to be bridged by domestic as well as foreign and private sector investment.

The factors responsible for time overruns were identified through a postal survey. The relative importance and significance of these factors was investigated. The results were then compared with earlier studies been done internationally. Delay in construction contract is one of the most common problems in the construction of traditional projects. In the BOT projects delay is mostly during the negotiation and signing of concession agreement rather than the actual construction phase. The results also show near agreement between the project participants-contractor, consultant and owner. An analysis of the responsibilities of delay causes suggests that all the participants should jointly make efforts to mitigate delays. A comparison between previous international literature shows that in traditional projects the causes of delay are mostly the same and there is no significant difference in causes based on geographic, cultural and socio economic factors. Contractor experience in planning and controlling is the most

important factor which affects the time overrun of the projects. In fact completing a project on schedule realistically depends on the contractor's experience and ability to control the site operations and to optimally allocate resources. The effective site management depends solely depends on the contractor's experience.

Delay in payments by owner hampers the progress of projects especially delays in running payments. Unforeseen ground conditions also affect the schedule of the project, after the work commences on the site. These may be on account of poor sub-soil conditions or obstructions, etc. Variations are a source of increase in time and cost.

Project delivery method of Built-Operate-Transfer (BOT) can increase the speed of construction. Although many BOT projects have been implemented worldwide, some projects have encountered major obstacles. Study results reveal that the political and the government issues are the most significant delay causes.

A hierarchical success model for identification of critical success factors is developed. Analysis of the data collected from experts is done by AHP and RII method separately. The results are compared with the result of previous studies. To validate the results agreement analysis was made. In the first stage Relative Importance Index method was used to identify the Critical Success Factors (CSFs) from the data of first questionnaire in which the opinion of the experts was sought on a scale of 1 to 5. Based on the result of RII method, the second questionnaire was developed using the Analytical Hierarchy Process (AHP) method. The CSFs identified were found to be consistent with previous studies.

Personal interviews of the project managers, contractors, government executives were also conducted after identification of critical success factors from the field survey. The experts interviewed were of the opinion that BOT method of procurement does not imply a hands-off approach on the part of the government. BOT arrangement only transfers the risks from the government to the private promoter. From the viewpoint of Government the money should be

spent economically, efficiently and effectively. The government i.e. the public procurer seeks to utilize private sector money and expertise and thereby achieve value for money which may come from the private sector innovation and skills in design, construction and operation of the project. Even though the Government transfers key risks in design, construction delays, cost overruns and finance etc. to a private sector entity, however, risk transfer may be misleading. The project sponsor in PPP forms a highly geared special purpose company (SPC) for the project vehicle and consequently, a reliance on revenues to pay for operating cost cover debt financing, giving the requisite return on the risk capital. PPP projects are viable only if continuous long term revenue is assured otherwise it is the greatest risk to the viability of the project.

As the straight equity participation is very low in PPP projects, the risk is borne by lenders which provide finance or financial guarantees. The providers of finance look the cash flow of the project as the source of funds for repayment as the financing is without recourse to sponsor companies.

Further, the failure of these projects leads to a loss to the public in general and therefore the government also. The success of a BOT project, therefore, depends crucially on the pro-active role of the governments by an appropriate allocation of risks at an early stage of the conceptual phase of project. It is validated by the identification of 'Government support' as one of the CSFs in the top ten critical success factors for BOT project. Hence, there exists a need to develop some guidelines that helps the government in providing a supportive legal, political and commercial environment for the BOT project.

In the present study, two critical success factors namely short construction period and selection procedure of concessionaire are identified among the top ten factors for the success of BOT projects. These two factors were not considered in the previous study made by **Zhang (2005)**. The CSFs found for BOT projects are quite different than CSFs for traditional projects. All the participants of a BOT project are having a common goal and their interests are not clashing resulting in better coordination during the construction phase of the project. The top ten success factors identified in this study have been discussed details.

The effect of short construction period of a project on its profitability has been studied in this research work by varying the total construction period. It is observed that even spending more for reducing the construction time the overall profitability of the project enhances significantly.

The various types of risk encountered in BOT projects were analyzed from the perspective of various key participants. Based on the study of the literature survey infrastructure BOT projects in North America, Asia including India were analyzed. The project risks that were determined to be most significant were political, financial and market risk. A decision model was developed that can be used by BOT promoters in selecting appropriate financial strategies.

Based on the analysis of case studies reported in the literature a decision model is developed in which a project promoter can select an appropriate financial strategy depending on the possible risk to be faced during the project life cycle. Sector specific recommendations are also made to improve the regulatory environment.

The low-bid method fails to serve the public interest because the lowest offer may not result in the lowest overall cost to the public. Best-value contracting strategy aims at using price and other key factors in the evaluation and selection process to enhance the long-term performance of projects. A new concept of best-value modeling that is unique and tailored to each project is discussed. Primary parameters that impact contractor selection are identified and analyzed based on which best-value concessionaire selection model is designed

In India and many other countries the selection of concessionaire is based on an open competitive bidding. All project parameters such as the concession period, toll rates, price indexation and technical parameters are to be clearly stated upfront and short listed bidders will be required to specify only the amount of grant sought by them. The bidder who seeks the lowest grant should win the contract. In exceptional cases, instead of seeking a grant, a bidder may offer to share the project revenues with the Authority.

The prequalification process adopted in India and in other developed and developing countries to shortlist the eligible bidders for the BOT projects is presented in the thesis. In most of the cases it is the screening of the contractors by owners based on set of criteria. Infrastructure project promoter qualification is not only very crucial for project success but is a complex multi attribute decision making problem under uncertain environment. A framework based on AHP is proposed for ranking various applicants depending upon the specific project characteristics. The framework includes selection of basic criteria and the assessment of their weights, systematic aggregation and finally to rank the applicants for prequalification.

The model has been implemented using Microsoft excel. A simple procedure is developed to get the sensitivity analysis of the problem to study the variations because of change in the values of input parameters.

Further supportive research is required for the analysis of various risk factors and uncertainties involved in BOT projects. Sensitivity analysis can be applied considering all the criteria at the lowest level. **Comparative study of different methods of defuzzification can be made.**

8.2 RECOMMENDATIONS TO PRACTITIONERS

(Owner, Promoter, Public, Financial institutions)

1. The identification and ranking of CSF's will help owners, professionals and governments to provide more attention to them so that the scarce resources are optimally utilized for successfully completing the project.
2. The causes of delays identified can be managed so as to avoid time overruns of the project.
3. The model developed for short listing the BOT promoter can help owner, government to prepare a ranked list of various applicants so that the time required during the prequalification process can be reduced.

4. The best value method will provide the owners to incorporate non price factors also while selecting the contractor who will provide the best value to the owner.
5. By crashing the project duration the owner/ promoter can increase his profit margins as well as the facility is available to the public earlier creating win-win situations.
6. The guidelines and recommendations provided can be used by the government, promoters and the lenders for a win-win strategy in BOT projects.
7. Sensitivity test will help the owners/ govt. to ensure that the results would be sufficiently robust and will not be easily altered due to slight variations in one or more weighting factors.