

The Prioritisation of Different Stages of PPP Project Using Ahp Technique: In Context To Indian Road Project

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Abstract- PPP (public private partnership) is a partnership between the public and private sectors with clear agreement on shared objectives for the delivery of public infrastructure and/or public services.

Public private partnership projects are much needed as they can provide capital to finance government programs and projects, thereby freeing public funds for core economic and social programs also there is a well-defined allocation of risk between the private sector and the public entity and the private entity.

In our research we are finding out various factors affecting the different stages being involved in the PPP projects. Then the factors affecting the various stages of PPP project are listed out and prioritized with the help of analytical hierarchy process technique so as to calculate which stage is more to be focused on.

Keywords- Social programs; Public Private Partnership; Private entity; Analytical hierarchy.

I. INTRODUCTION

Almost in all developing countries the governments face the challenge to meet the growing demand for new and better infrastructure services as funding available from the traditional sources and capacity in the public sector to implement many projects at one time remain limited so the governments have found that partnership with the private sector is an attractive alternative to increase and improve the supply of infrastructure services. PPP is defined as any agreement where the public and private sectors work together to deliver a public project and the arrangements where the public and private sectors both bring their complementary skills to a project, with varying levels of involvement and responsibility, in the purpose of providing public services or projects.

Public-private partnership i.e. PPP is a procurement approach where the public and private sector join their forces to deliver a public service or facility. In this kind of arrangement normally both the public and private sector contribute their expertise and resources to the project and share the risks involved. The definition of PPP differs slightly among different jurisdictions, depending on which part of the arrangement the importance is focused. The term PPP can also be described as: An arrangement for the provision of assets or services, often in combination and usually for a substantial or complex "package", in which both private sector supplier and public sector client share the significant risks in provision and/or operation. In this definition there is an emphasis that both the public and private parties share a large risks in a PPP project. While in reality it is not always that an equal split of risks is experienced. Normally, each party will want to pass on more risks to the other party and is noticed that this occurrence is more common in developing countries or jurisdictions where the government has less experience in this alternative procurement method. A feasibility study is conducted during the (project's) Appraisal phase and it verifies whether the proposed project is well-founded and likely to meet the needs of its intended target groups / beneficiaries. The study should design project in its operational details which in terms taking account of all policy such as technical economic financial institutional management environmental socio-cultural gender- related aspects. The feasibility study will provide the EC and partner government with sufficient information to justify acceptance modification or rejection of the proposed project for further financing. The detailed planning and feasibility study of all projects is based on the most recent data and information usually collected from a variety of primary and secondary sources and previous studies. The physical components of the project and their capacities are determined on the basis of outcomes of the feasibility study thereby, determining the service requirements that the project has to deliver. All the PPP projects should be subject to social cost-benefit analysis based on a proper feasibility study to examine its public as well as private benefits of project. Result of the feasibility study provides essential input for decision making

process. A financial analysis considering all the costs will be undertaken to determine the commercial viability of the project. The economic and financial analyses are undertaken to establish the need and size of the project, and to provide the basis for any government support (including participation in financing), if necessary. All cost calculations for a project should be based on its life cycle costs. Consideration of life cycle costs is necessary to establish the business case for a project.

II. OBJECTIVES

1. To study details of various PPP models and different stages in PPP models.
2. To study and identify various problems that occur during different stages of PPP Project in context of Road Construction Project.
3. To priorities the various problem in different stages of PPP Project using Analytical Hierarchy Process (AHP).
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III. METHODOLOGY

The Methodology adopted in this research is as follows:

1. Literature review is to be done in order to obtain the data regarding the work already done in this area. It will enable in obtaining the already identified success factors considered for project selection. The data for the same will be collected through Internet, Online Portals, Journals, Magazines, Books and Case Studies.
2. On the basis of literature review, various problems to be identified in different stages of PPP Project.
3. A questionnaire is to be prepared on the basis of problems identified in different stages of PPP Project.
4. Data is to be collected by floating prepared questionnaire to working professionals from various contractors and companies.
5. Analysis is to be done for prioritization of different stages of PPP Project using Analytical Hierarchy Process (AHP)

IV. THEORETICAL CONTENTS

For this study, an online survey was utilized to gain the opinion of respondents from different PPP infrastructure sectors and from different parties. The questionnaire is divided into two main parts: part one deals with general information (classification data) about the respondents such as the

1. Name of the Respondent.
2. Name of the Organization
3. Department of Working

The second part of the questionnaire mainly aimed to identify the significance of each risk factor. Likert type scale has been used as a rating system for the criticality of each factor in the questionnaire. The questionnaire respondents were asked to list the significance of potential risks identified on a scale of 1-5, where 1 represents “Low-significant” and 5 represents “High significant”. Problems identified is as follows :

- Problem faced during document approval
- Problem due to planning deficiency
- Problem due to political environment
- Problem due to land acquisition
- Problem due to long tender process
- Problem due to few eligible bidder
- Problem due to high financing cost
- Problem because of discounted payback period
- Problem due to long term cash flow(for lender)
- Problem because of Long term demand for a product and service offered by Project
- Problem because of Construction Cost overrun
- Problem because of Safety
- Problem because of Time overrun
- Problem because of availability problem of Capital
- Problem because of lack of coordination of Sub-contractors
- Problem due to fluctuating demand
- Problem due to Operation Cost overrun
- Problem because of Operator inability
- Problem because of changing interest rate
- Problem because of low operation productivity
- Problem due to design deficiency
- Problem due to design flexibility
- Problem when there less demand of the project at the time of transfer
- Problem because of low residual value

The total responses received were 20 fully completed questionnaires were received and included in the analysis. The results gained from each participant in the survey were calculated using a Quantitative Score method to estimate the value of Mean Scores (MS) of importance for each factor. A Summary of Respondent’s Mean Scores of importance is provided in Table 1. The questionnaire results were analysed further using the AHP method to identify the relative weights of the each factor and identifying in which stage of project more care has to be taken.

V. THE ANALYTIC HIERARCHY PROCESS

The Analytic Hierarchy Process (AHP), introduced by Thomas Saaty and it is an effective tool for dealing with complex decision making and may aid the decision maker to set priorities and make the best decision. By reducing complex decisions to a series of pairwise comparisons and then synthesizing the results the AHP helps to capture both subjective and objective aspects of a decision. The AHP incorporates a useful technique for checking the consistency of the decision makers evaluations thus reducing the bias in the decision making process.

How the AHP works

The AHP considers a set of evaluation criteria and a set of alternative options among which the decision is to be made. Since some of the criteria could be contrasting, it is not true in general that the best option is the one which optimizes each single criterion rather the one which achieves the most suitable trade-off among the different criteria. The AHP generates a weight for each evaluation criterion according to the decision maker's pairwise comparisons of the criteria. The higher the weight, the more important the corresponding criterion. Next for a fixed criterion the AHP assigns a score to each option according to the decision maker's pairwise comparisons of the options based on that criterion. The higher the score, the better the performance of the option with respect to the considered criterion. Finally the AHP combines the criteria weights and the options scores, thus determining a global score for each option, and a consequent ranking. The global score for a given option is a weighted sum of the scores it obtained with respect to all the criteria.

Features of the AHP

The AHP is a very flexible and powerful tool because the scores and therefore the final ranking, are obtained on the basis of the pairwise relative evaluations of both the criteria and the options provided by the user. The computations made by the AHP are always guided by the decision makers experience and the AHP can thus be considered as a tool that is able to translate the evaluations made by the decision maker into a multi criteria ranking. In addition, the AHP is simple because there is no need of building a complex expert system with the decision makers knowledge embedded in it. On the other hand the AHP may require a large number of evaluations by the user, especially for problems with many criteria and options. Although every single evaluation is very simple since it only requires the decision maker to express how two options or criteria compare to each other the load of the evaluation task may become unreasonable. In fact the number of pairwise

comparisons grows quadratic ally with the number of criteria and options. However AHP will reduce the decision maker's workload and helps to completely or partially automated by specifying suitable thresholds for automatically deciding some pairwise comparisons.

VI. CONCLUSIONS

The main aim of the study was to find the problems faced during the complete project cycle of PPP road projects in India. From the extensive study over the stages with the help of questionnaire technique and with the application of AHP technique we were successfully able to prioritize different problems in a PPP road project. During the study three analysis were done. First analysis was between all the 24 problems identified. This analysis helped to prioritize all the problems and thus helped in understanding which problem plays the most important role during the cycle of a project. From the analysis it was found that 'Problem because of time overrun' plays the most vital role for any Indian PPP road project. Thus we conclude that if anyone is considering taking a PPP road project in India that for the success of his project he have to concentrate more toward the problem of time overrun and invest more of his resources towards it for the success of the project. The top six problem one should always consider while taking the project are 'Problem because of Time overrun', 'Problem due to land acquisition', 'Problem because of Construction Cost overrun', 'Problem due to planning', 'Problem due to high financing cost', 'Problem due to design deficiency.' Thus these are the top six problem one always consider first for its project success. Second analysis was done to within each seven stages to determine which problem in each stage plays the most important role and need more concentration. In feasibility stage it was found that 'Problem due to planning' plays the most important role. In tendering stage it was found that both long tendering procedure and few eligible bidders plays important role. In financing stage it was found that 'Problem due to high financing cost' plays the most important role. In design stage it was found that 'Problem due to design deficiency' plays the important role. In construction stage study showed that 'Problem because of Time overrun' need more attention. In operation stage it was found that 'Problem due to Operation Cost overrun' is most important problem. In handover stage 'Problem when there less demand of the project at the time of transfer' plays the most important part. Third analysis was done to prioritize the seven stages. For this analysis was between the seven stages and it was found that construction stage for any road PPP project plays the most important role. And tendering stage plays the least important role. Thus while taking any road PPP project one should always concentrate more towards construction stage and plan accordingly.

VII. FUTURE SCOPE

The results of this study can be made accurate or concrete by filling up of responses of the questionnaire from the respondents of various firms across the country. The study can be further completed for different PPP models as we have limited the study considering all PPP model as one. We have restricted the study to review and thereby critically analyze the Analytic Hierarchy Process (AHP) as a developed decision-making tool that can be used to prioritize the different stages of PPP Project. This study limits itself to the responses from road construction firms, whereas, it can be used as guideline for the prioritization of different stages irrespective of the type of construction industry (Real Estate, Infrastructure, Consultancy etc.)

REFERENCES

- [1] A Guidebook on Public-Private Partnership in Infrastructure Project.
- [2] A Guide Book on Types of PPP Projects
- [3] Saaty, T.L., 1980. "The Analytic Hierarchy Process." McGraw-Hill, New York.
- [4] LiYaning, T. A. N. G., &Shen, G. Q. (2013). Finance-Related Critical Success Factors for the Briefing of PPP Projects in Construction.
- [5] Li, J., &Zou, P. X. (2011). Fuzzy AHP-based risk assessment methodology for PPP projects. *Journal of Construction Engineering and Management*,137(12), 1205- 1209.
- [6] Alasad, R., Motawa, I., Ogunlana, S., &Boateng, P. (2014, May). Prioritization of Demand Risk Factors in PPP infrastructure projects.In *Construction Research Congress*.
- [7] Zhou, C., Wang, B., &Guo, Y. (2014). An Innovative Application of AHP and Value Engineering Techniques in Project Management of High-Rise Buildings. In *ICCREM 2014@ sSmart Construction and Management in the Context of New Technology* (pp. 619-626).ASCE.
- [8] Jeerangsuwan, T., Said, H., Kandil, A., &Ukkusuri, S. (2012, May). Optimization Application for Financial Viability Evaluation of PPP Toll Road Projects. In *Construction Research Congress 2012*.
- [9] Zhao, J., Gou, M., & Li, L. (2013). Financing Risk Analysis of Chinese Metro Projects Based on the AHM-Fuzzy Evaluation Model. In *ICCREM 2013@ sConstruction and Operation in the Context of Sustainability* (pp. 693-701). ASC