

Feasibility Analysis and Risk Identification of Infrastructure Project – A Case Study on Two Irrigation Project

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Abstract— A feasibility study is an evaluation and analysis of the proposed project which is based on extensive investigation and research to support the process of decision making. Before carry out investment in any infrastructure project its feasibility study and analysis is necessary. In this paper feasibility analysis of two projects is carried out. This analysis can help to decide whether to support or reject the project at initial stage of project.

Key words: Feasibility Study, Feasibility Analysis

I. INTRODUCTION

The feasibility of the project has to be done that gives figures of cash flow during the project duration. This can be one of the considerations for making a decision whether the particular project is feasible or not. For a construction project, it is very important to take into consideration the various risks involved in the project at various stages while assessing the technical and financial feasibility of the project.

A *feasibility study* and *analysis* used in measuring the ability and likelihood to complete a project successfully including all relevant risk factors involve in the project. A detailed technical and financial analysis is necessary for the feasibility study of the project. For the feasibility analysis case study of two projects is carried out from that analysis two projects are comparing and according to that which project is more feasible is to be considered.

II. LITERATURE REVIEW

The following are the previous research review based on feasibility analysis

Venkata Suresh Addepalli (2017), has conducted research on important factors a for price escalation and some of the innovative approaches and e-governance that can be put in place to integrate the Risk Management and cost management to better arrive at project “Estimate At completion”. He also discusses some of the monitoring and controlling actions that needs to be refined to constantly evaluate the Risks and in turn the project “Estimation at Completion”.

He studied that According to the Database of Infrastructure Projects in India (Infrastructure. gov.in), over 4.3 lakh was spent in the financial year 2016-17 alone. This amount roughly equates to 3% of the estimated GDP for the same period. From the Database of Infrastructure Projects in India, 104 completed projects in the energy sector that were completed in the past 5 year 68 projects required more money than initially estimated and the highest being 3.65 times than the initial planned estimate. Out of these 68 projects, 8 were beyond 100% over run and were eliminated in the analysis as they are considered as outliers

Swapnil Wani, S. Raji (2017), systematically study the impact of financial risk management in the Real Estate construction industry by gathering data regarding different financial aspects from concerned, reputed and responsible employers and employees engaged in handling financial activities and use a proper method for the analysis of this data and provide the findings. They also highlights the impact of two most important financial risk management tools namely hedging and insurance on the performance of the project. The results show the classification of each events considered in the questionnaire, as per their importance of curbing financial risk in the construction project.

Divya Gupta, Manoj Sharma, Dr. Ashutosh Shankar Trivedi 2016, Their research found that risks are mainly related to (in ranking) contractors, clients and designers, with a few related to government bodies, subcontractors/suppliers and external issues. Among them, “Financial Risk” is recognized to influence all project destinations maximally, whereas working in hot areas, closure, defective design and delayed payments on contract are also some important risk factors. This research also found that the risks spread through the whole project life cycle and many risks occur in more than one phase, with the construction stage as the most risky phase, followed by the feasibility stage.

K. Jayasudha and B. Vidivelli 2016, they studied about the project management process and theirs different phases i.e. risk identification, risk estimation, risk response planning and its execution. After the study they examined the awareness of professionals in construction industry of the various types of planning techniques and tools used on construction sites, Questionnaires were administered on selected building professionals (Project Managers, Engineers, Architects), and Contractors and Sub-contractors directly involved in construction work on sites in planning and the use of planning tools and techniques as major tools for successful project execution.

Sneha Khedekar, Dr. A. W. Dhawale (2015), focused on types of risks involved in the project, risk factors, risk management tools & techniques. Identification of risk of the project in terms of the total cost of the project has been divided under Technical, Financial, Socio political and Statutory cost centers.

They analysis part of risk management on the basis of several analysis techniques, checklists, risk register, expert view etc. Qualitative & Quantitative assessment is carried out for risk involved in project. This study is useful for analyzing large scale real estate projects in Maharashtra; also suggest mitigation steps for different categories of risks 1) To understand the large scale real estate projects and the growing need for same in Indian Scenario. 2) To Identify and analyze the various risks i.e. present and the future risks

which may occur during the project construction and maintenance. 3) To prepare and recommend a checklist for identification of risks and their mitigation measures in the project under consideration.

Chaitali S. Pawar, Suman S. Jain, Jalinder R. Patil (2015), they study some suggestion on mitigation of risks in construction projects. They identify and analysis the risk associated with infrastructure project. Based on a comprehensive assessment of conditions of contracts, this paper identifies risks and classifies them into eight types.

They study of the risk management in construction contract and aims to identify the key problems in critical areas of construction project, which have the potential to become major roadblocks in the progress of the project. In present work, a case study Flyover in Pune city of Maharashtra state, India, has been referred. The study identify, classify of various risks in a given set of contract documents of construction project, and on basis of qualitative risk analysis, suggests methods to mitigate risks in construction project.

A.P Waghmare, S. S. Pimplikar (2012), they studied that Investment in construction project is able to give higher benefit beside of its high uncertainty. The uncertainty depends on many risk factors. The influence of the identified risk then has to be evaluated and calculated towards the project feasibility. Before investment, the feasibility of the project has to be done that gives figures of cash flow on the following years. This can be one of the considerations for making a decision whether this project is feasible or not. Risks that overshadow the construction project have to be calculated as an influential factor towards the failure of a project.

III. METHODOLOGY

Study of various literatures will be done to carry out to understand the concept of risk management in construction industry. Study will be carrying out to understand the different aspect related to risk assessment in irrigation project. Detailed analysis will be done, for that purpose data is collected consist of contract documents.

A. Feasibility Analysis:

Feasibility Analysis is carried out on the basis of the technical data received from the Amravati irrigation department for the project.

The main objective of feasibility analysis shall be focused on financial implication and outcomes of the project.

For analysis of project the project payback period, benefit cost ratio and net present values are calculated.

1) Project payback period

The payback period is the length of time required to recover the cost of an investment. The *payback period* of a project is an important determinant of whether to undertake a project, as longer as *payback periods* are typically not desirable for investment positions.

Payback period of any project can be identified by,
 $PBP = \text{Cost of the project} / \text{cash inflow in one year.}$
 Benefit/cost ratio (B-C ratio) – Cost benefit analysis gives the overall value for money of a project or proposal.

B-C ratio = Total annual benefit/total annual cost

Net present value (NPV) - Net Present Value (NPV) is the difference between the present value of all cash inflows and cash outflows associated with an investment project. The NPV establishes whether or not the investment project is an acceptable investment, given the return the investor requires from the investment.

Net present value is identified by,

$NPV = \text{Present value of cash inflows} - \text{initial investment.}$

2) Analysis of project 1

Data - Net project cost – 41.72

Catchment area (CA) - 8.82 km²

Irrigated command area (ICA) – 26.82 Ha

1) Payback period = Cost of the project/ Cash inflow in one year.

$$= 41.72/9.71$$

$$= 4.3 \text{ years}$$

It is positive and obtained in between 4-5 years

2) Benefit cost ratio = total annual benefit/ total annual cost

$$= 9.71/ 13.58$$

$$= 0.007$$

Positive but at boundary

3) Net present value = 13.58 x 8 – 41.72

$$= 66.92$$

The net present value obtained is positive, hence project is feasible and accepts.

3) Analysis of Project 2

Data - Net project cost - 19.54

Catchment area – 5.14km²

Irrigated command area – 18.56 Ha

1) Payback period = Cost of the project / cash inflow in one year.

$$= 19.54/6.51$$

$$= 3 \text{ years}$$

It is positive and below 4

Hence it is extra beneficial.

2) Benefit cost ratio = Total annual benefit/ total annual cost

$$= 6.51/23.2$$

$$= 0.28$$

Hence positive and it is beneficial.

3) Net present value = 23.1 x 7 – 19.54

$$= 142.86.$$

The value obtained is more than 100% hence it is feasible.

IV. RISK IDENTIFICATION

Risk identification is done by interviewing authorised government officers and technical person.

Different risk considered for risk management are- Financial risk, Political risk, Legal risk, Environmental risk, Force majeure risk, Operating risk, Technical risk and Miscellaneous Risks

V. RESULT & CONCLUSION

From analysis of two projects with the help of payback period, benefit cost ratio and net present value both the project are feasible, but the second project is more feasible by considering the payback periods of both the projects.

VI. FUTURE SCOPE

In the above work the parameters like payback period, benefit cost ratio and net present value are use to find out the feasibility analysis of two irrigation projects. It can also help to find out the feasibility of other infrastructure projects in future, to avoid the upcoming risks of the projects.

REFERENCES

- [1] Yvonnia N. Marowa, Goodwell Muyengwa, (2015) "Risk Assessment in Infrastructural Project", International Association for Management and Technology (IAMOT)
- [2] Vyankatesh Suresh Adepalli (2017)," Integrating of risk management and cost management to arrive at a realistic Estimate at completion", Project Management National Conference.
- [3] Krantikumar Mhetre, B. A. Konnur, Amarsinh B. Landage (2015), "Risk Management in Construction Industry", International Journal of Engineering Research (IJER) volume no. 5
- [4] Swapnil Wani, S. Rani (2017)," Financial Risk Management of Construction projects", e-ISSN 2455–1392 Volume 3 Issue 9,
- [5] Sneha Khedekar, Dr. A. W. Dhawale (2015), "Qualitative Risk Assessment and Mitigation Measures for Real Estate Projects in Maharashtra" Volume 3, Issue 4.
- [6] Chaitali S. Pawar, Suman S. Jain, Jalinder R. Patil, (2015)" Risk Management in Infrastructure Projects in India" International Journal of Innovative Research in Advanced Engineering (IJIRAE) ISSN: 2349-2163 Issue 4, Volume 2
- [7] A. P. Waghmare, Dr. S. S. Pimplikar (2012), "Risk Analysis in Feasibility Study Of Road Construction Project: Case Study Construction Of The Four Laning Of Amravati – Talegaon Section Nh-6.", ISSN: 2248-9622 Vol. 2, Issue 3.
- [8] A. P. Waghmare, Dr. S. S. Pimplikar, June 2012,"Financial Analysis of Infrastructure Project - A Case Study on Built-Operate-Transfer Project in India", International Journal of Engineering and Advanced Technology(IJEAT) ISSN: 2249– 8958, Volume-1, Issue-5. 2
- [9] P. Jagadesh and Y. Suma (2017), "Evaluation and management of risks in construction projects, International Journal of Engineering Researches and Management Studies, ISSN: 2394-7659. 9. Manual For Preparing feasibility Studies, NICMAR publications.
- [10]Prasanna Chandra, Fourth Edition, "Projects- Planning, Analysis, Selection, Implementation and Review".