

Economic and Financial Analysis for Feasibility Study of Public Private Partnership Road Project

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Abstract—Investment in infrastructure projects plays a key role in the efficient development of the country. Infrastructure project investment depends on the parameter like feasibility of the project which helps in the decision making process considering various aspects such as financing, designing, construction, operation and maintenance of the project. Public Private Partnership (PPP) gives valuable opportunity to Private Sector to contribute in the modern era in the development of Infrastructure projects. Private Sector's willingness to participate with Public Sector in the PPP depends on the economic and financial analysis of the project, which draws the viability in terms of benefits in near future as well as throughout the project life cycle. This study involves Economic and financial Analysis of existing 14.2 Km Thane-Ghodbunder PPP road project by improving existing four lane to six lane. Economic analysis results very large amount of savings in Vehicle Operating Cost due to improvement of Thane-Ghodbunder road and financial analysis results in the interest of benefits from the projects to either of the participant. Therefore, Thane-Ghodbunder road project which operates on Built, Operate and Transfer (BOT) basis can be beneficial for Private Partner.

Keywords: Feasibility study; Public Private Partnership; Financial Analysis; Economic Analysis

1. INTRODUCTION

India is one of the fast developing countries in the world. The future development of our country is depending on the development of its infrastructure and efficient delivery of its services. But the major problem faced by many developing countries in completing large infrastructure project is, that of Financing. There is always a shortage of funds with the Government, so many of the projects get delayed or these projects have to be cancelled. India must invest large amount of money in Infrastructure and its Maintenance. As there is very large amount of Infrastructure to be built and it require large sum of money a support from Private sector is necessary. This participation of Private Sector is necessary both in terms of Financing and in terms of Implementation of the Infrastructure Project. Public Private Partnership (PPP) is therefore considered as Inevitable, in order to succeed Indian Infrastructure. Investment in infrastructure projects plays a

vital role in development of the country. In order to determine whether the said investment should be undertaken or not, its feasibility needs to be considered in decision making in accordance with the several different aspects. PPP gives most valuable opportunity to Private Sector to participate in Public Sector programs or projects such as financing, designing, construction, operation and maintenance. Thus, the objective of the research is to explore the concept of feasibility study for Public Private Partnership projects and to carry out the economic and financial analysis of existing 14.2 km Thane-Ghodbunder road project by improving existing four lanes to six lanes.

2. DATA COLLECTION AND METHOD

The current research aims at carrying out the economic and financial analysis of Thane-Ghodbunder Road Project which is on Public Private Partnership basis. Traffic Data is collected from Maharashtra State Road Development Corporation. Thane-Ghodbunder Road is state Highway No.42 starting at chainage 497/00 km of NH-8 and ending at NH- 3 near Kapurbawadi. It is one of the major links connecting Eastern Express Highway (NH-3) to Mumbai- Ahmadabad Highway (NH-8). It is also an important Road connecting cities like Thane – Borivali / Dahisar, etc. The growth of Thane and Mumbai City due to the rapid industrialization has resulted in phenomenal increased in road traffic on this link. The research aims to abate this gap by improving the existing four lanes to six lanes.

2.1 Method used for economic and financial analysis

Out of the various methods of capital budgeting, the Internal Rate of Return Method (IRR) is the one used in the study. Internal rate of return is that discount rate, for which the NPV value is zero. This can be obtained by setting the value of NPV in Equation of Net present value method as zero, and solving (by trial and error) for the value of discount rate. If the rate of return thus calculated is more than the market interest, then the project is viable for execution.

2.2 Comparison of IRR to other standard methods

2.2.1 Cost Benefit Ratio Method

The cost-benefit model is simple to use, but sometimes when the cost-benefit ratio of two models are close to each other, it becomes difficult to interpret, and choose the best option. Some components whether will be treated as benefit or cost (i.e. whether it will go to the numerator or denominator), sometimes appear confusing. This is because savings in cost is benefit in other words.

2.2.2 Net Present Value Method

Similar to the cost-benefit ratio method, in the NPV method also some discount rate is assumed, and various alternative projects are compared. If different discount rate is assumed instead, the order of choice among the alternatives may change. Hence, it becomes difficult to interpret the actual result.

2.2.3 Internal Rate of Return Method

IRR method itself finds out the discount rate, and therefore inaccuracy in analysis in assuming some arbitrary discount rate (as is done in cost-benefit ratio or in NPV method) is taken care.

Thus, IRR method seems to be the most preferred method for Economic and Financial analysis.

3. DATA ANALYSIS AND RESULTS

3.1 Economic Analysis

The purpose of the economic analysis is to select the most economic optimum solution among various alternatives investigated for the road project. The economic analysis balances the costs of various options against the benefits constituted by savings in road user costs. The selection of alternatives is based on the Net Present Value (NPV) and Internal Rate of Return (IRR). It compares the total NPV of all costs and benefits of an alternative with the NPV of all costs and benefits for the 'without project' alternative where the existing four-lane road is maintained. The Cost Benefit Data is tabulated as shown. (Table 1)

Table 1: Calculation of EIRR (Economical Internal Rate of Return)

Calculation of EIRR (Economical Internal Rate of Return)								
Case 1			Case 2					
Year	No. of Years	Maintenance Cost	Total VOC (Vehicle Operating Cost)	Construction & Maintenance Cost	Total VOC (Vehicle Operating Cost)	Cost Streams	Benefit Streams	Net Benefit
2004	0	30000.00	515014.785.71	23050.0000	488821.951.76	23050.0000	26192.833.95	-20430.7166.05
2005	1	30000.00	536715.843.54	37200.0000	509235.928.77	37200.0000	27479.914.78	-97200.85.22
2006	2	30000.00	529150.501.16	45000.0000	502279.219.69	45000.0000	26871.281.47	22371.281.47
2007	3	30000.00	551585.087.64	45000.0000	523448.074.99	45000.0000	28137.012.65	23637.012.65
2008	4	30000.00	576459.688.69	45000.0000	545301.391.93	45000.0000	31158.296.76	26658.296.76
2009	5	30000.00	598866.910.41	45000.0000	565309.230.22	45000.0000	33557.680.20	29057.680.20
2010	6	30000.00	622267.550.96	45000.0000	587724.335.40	45000.0000	34543.215.56	30043.215.56
2011	7	30000.00	667677.861.64	37200.0000	610996.233.69	37200.0000	56681.627.95	19481.627.95
2012	8	30000.00	775681.223.90	45000.0000	635802.809.94	45000.0000	13987.8413.95	13537.8413.95
2013	9	30000.00	945942.188.45	45000.0000	662392.852.70	45000.0000	28354.9335.76	27904.9335.76
2014	10	30000.00	994108.735.90	45000.0000	684472.860.22	45000.0000	30963.5875.69	30513.5875.69
2015	11	30000.00	104605.2176.13	45000.0000	707454.871.27	45000.0000	33859.7304.86	33409.7304.86
2016	12	30000.00	110203.7498.11	45000.0000	731346.277.81	45000.0000	37069.1220.29	36619.1220.29
2017	13	30000.00	115634.4748.83	37200.0000	756026.670.63	37200.0000	40031.8078.20	36311.8078.20
2018	14	30000.00	121181.8664.66	45000.0000	781828.998.37	45000.0000	42998.9666.29	42548.9666.29
2019	15	30000.00	127231.7576.40	45000.0000	808609.809.88	45000.0000	46370.7766.52	45920.7766.52
2020	16	30000.00	133909.2282.52	45000.0000	836490.652.08	45000.0000	50260.1630.44	49810.1630.44
2021	17	30000.00	141326.1579.82	45000.0000	864106.458.67	45000.0000	54915.5121.15	54465.5121.15
2022	18	30000.00	149659.6601.84	45000.0000	898298.503.60	45000.0000	59829.8098.25	59379.8098.25

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The Economic Internal Rate of Return for 15 years (EIRR) and Net Present Value (NPV) for the Thane- Ghodbunder Road Project Road for Flexible Pavement option are as shown. (Table 2)

Table 2: Economic Analysis Results in EIRR %

Thane- Ghodbunder Road	Economic Net Present Value of Net Benefits at 12 % Discount Rate (Rs in Lakhs)VOC only as Project Benefit	Economic Internal Rate of Return in %(EIRR)All Savings only as Project Benefit
Length 14.9 km	5937.98	29%

The results of the Economic analysis of Thane- Ghodbunder Road shows that the widening and strengthening of existing road is economically viable with an EIRR of 29 % for the total road project.

3.2 Financial Analysis on BOT Basis

The main objective of undertaking the current study is to assess whether the project is financially viable or not under Build, Operate and Transfer (BOT) system. The basic methodology followed for estimating the financial viability of the project is to calculate the FIRR (Financial Internal Rate of Return) on the investment for the project.

By considering the total construction cost of the project, maintenance cost, toll revenue, benefits and other expenses; the financial internal rate of return is calculated as shown. (Table 3)

Table 3: Calculation of FIRR

Calculation of FIRR (Financial Internal Rate of Return)	
Year	Total Annual Toll Revenue
Construction Cost	-2442160000
Maintenance Cost	-160500000
2008	253306350
2009	286243950
2010	377948375
2011	427075550
2012	482617600
2013	645290800
2014	729151375
2015	823949175
2016	1319274250
2017	1490773150
2018	1684542525
2019	1903526100
2020	2598885775
2021	2936430475
2022	3024523389

Based on the project structure traffic study and toll rate analysis, financial analysis has been carried out and the results are as shown. (Table 4) The objective of the financial analysis

is to make sure of the existence of project returns. These returns should successfully meet the expectations of private operator and its financial investors.

Table 4: Financial Analysis Results in FIRR%

Thane Ghodbunder Road	Financial Internal Rate of Return in %(FIRR)
Length 14.9 km	21%

4. CONCLUSION

The current research aims at carrying out the Economic Analysis of Thane-Ghodbunder Road project from both Economic appraisal of a project and Financial Analysis of private sector party's point of view, for their future benefits. In this project Economic appraisal of the project is calculated in terms of Vehicle Operating cost, means how much vehicle operating cost can be saved by implementing widening and strengthening of existing 4 lanes road to six lanes. This Economic analysis gives us an idea about whether this project is beneficial for road user in terms of saving in operating cost or not, and the analysis carried out states that it can be beneficial and viable.

Financial analysis is done to know whether private party's investment in the project and whether the desired benefits are achievable or not in the given concession period which is 15 years for this project. Also, the payback period is found to be 6.22 years which means that the allocated capital can be redeemed within this span. The results on financial analysis conclude that Private Partner can achieve his benefits. Therefore, the study concludes that the Thane-Ghodbunder Road Project which operates on Built, Operate and Transfer (BOT) basis can be beneficial for Private Partner. Improvement of Thane-Ghodbunder Road is also adding many Social Benefits to the Society.

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