A Review on Survey Based Comparative Analysis Model for Public and Private Bus Services in Maharashtra State

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ABSTRACT

For the purpose of mass movement between various cities public transportation are one of the most predominating and cost effective way of transportation. As they are providing plenty of services their passengers, which help them to complete their journey in the most comfortable way. In addition to public transport service, many private entities have entered into the market to provide much better services and facilities as compared to public bus services. For better understanding between private and public players in this industry, a complete comparative based cost benefit analysis is performed between them and also stated the model formulation procedure. Further research work will be to formulate cost allocation model to decide the priority of services

Keywords : Service parameters, Cost benefit analysis, Comparative analysis, Cost allocation factor

I. INTRODUCTION

Mobility of human beings is an important behavioural trait of modern age. Provision for a continuous and uninterrupted mobility of man and materials is a basic necessity of the society. Thus, road transport service provides both- time and place utilities. Transportation and communication accelerate the economic and commercial growth of a nation and reduce the global radius to bring the countries closer to achieve the concept of global village. It links up villages, towns, countries and continents and broadens the market,

fosters, greater factor utilization, promote greater methods of outsourcing, recreations, civilization etc. the State Road Transport sector of a country's economy. Thus, an efficient transport system is the yardstick of an economy.

In India, growth of the population emergence of large manufacturing industry, imbalanced regional development have all contributed to the development of various modes of transport of all the different modes of transport, road transport is one of the most popular as of it being readily available, flexible

operations, and high adaptivity to individual needs, door-to-door service and reliability. Road transport acts as a feeder services to rail, marine and air traffic. Government of India recognized in its plan of development programs that roads are an inherent infra of the social and economical growth of country. Allocation of cost in any sector is one of the major issues that govern the credibility, productivity and profitability of any project undertaken by that sector. It helps individuals as well industry to focus on major areas of a project which may require special attention, in order for its growth and expansion. The study which is undertaken for the purpose of analysing the various segment of cost and which is allocated into the road transport industries. For this purpose, we have taken into account two entities i.e. public sector road transport industry and private sector road transport industry. In public sector we have analyse Maharashtra State Road Transportation Corporation and from private sector we have taken Vijayanand Roadways Limited (VRL private).

II. METHODOLOGY

a) Cost benefit Analysis-

Analysis Parameters-Following formulas were used for calculating parameters associated with CBA

i) Benefit- Cost Ratio- Benefit-Cost ratio is indicator that shows relationship between the relative cost and benefit of suggested project, expressed in pecuniary or qualitative term. If the project has a BC ratio more than 1, the project is expected to give a positive present value to a firm and investors.

B/C ratio<1=Bad investment while a B/C ratio≥1= Good investment.

The formula for benefit-cost ratio is:

$$\text{Benefit-Cost Ratio} = \frac{\sum \text{Present Value of Future Benefits}}{\sum \text{Present Value of Future Costs}}$$

ii) Net Present Value (NPV) - The net present value/ net present worth refers to a series of cash flows occurring at different times. The present value of cash flow depends on interval of time between now and the cash flow. It also depends on discount rate.

Formula:

$$NPV = \frac{R_t}{(1+i)^t}$$

NPV= Net present value

R_t = Net cash flow at time t

i = Discount rate

t= Time of the cash flow

iii) Internal Rate of Return (IRR) - Internal rate of return is the method of calculating an investment's rate of return. The term internal implies to the fact that calculation excludes external factors, such as the risk -free rate, the cost of capital, inflation, financial risk. This is simply the interest rate at which NPV of the cash flow of the alternative equals to zero value.

Formula,

$$NPV = \sum_{n=0}^{N} \frac{C_n}{(1+r)^n}$$

Where,

NPV = Net Present Value

N = Total number of periods

n = Non-negative integer

C_n = Cash flow

r = Internal rate of return

We have carried out a cost benefit analysis of both private and public entities. In the analysis, we calculated the three most important aspect of CBA i.e. B/C ratio (Benefit-Cost ratio), NPV (Net Present Value) and IRR (Internal Return Rate) and it is comparative based analysis is as follows-

b) Comparative Based Cost Benefit Analysis:-
After qualification and monetization of all costs and benefits the respective data was input into respective CBA tables for both the alternatives (i.e., MSRTC and

Private Travel Buses). The table below represent CBA of both alternatives. At the bottom of each table, the Benefit Cost ratio, Net present value and internal rate of return for each alternative is provided.

Table 1 : Cost benefit analysis of MSRTC (Values in lakhs)

	DISCOUNT FACTOR	INVESTMENT COST	REVENUE COST	CASHFLOW	DISCOUNTED CASH FLOW
2017-18	1	8196.27	7168.01	-1028.26	-1028.26
2018-19	0.91	9068.68	8120.23	-948.45	-863.09
2019-20	0.83	8790.2	7870.99	-919.21	-762.944
2020-21	0.75	5866.32	4138.1	-1728.22	-1296.17
2021-22	0.68	10198.31	6890.37	-3307.94	-2249.4
	Total	42119.78	34187.7		
				NPV	-13069.864
	BC RATIO	0.4686		IRR	-39%

The above figure represents an analytical cost benefit analysis of public bus transportation. From the analysis, it is found three major parameters, they are as follows:

1. B/C ratio- 0.4686
2. NPV- 13069.864
3. IRR- 39%

Table 2 : Cost benefit analysis of Private travel sector- VRL

Compamy (Values in lakhs)

	DISCOUNT FACTOR	INVESTMENT COST	REVENUE COST	CASHFLOW	DISCOUNTED CASH FLOW
2017-18	1	593.22	1936.55	-44.22	-44.22
2018-19	0.91	645.93	2117.46	-209.15	-208.24
2019-20	0.83	676.87	2128.86	-118.55	-117.72
2020-21	0.75	579.14	1775.78	-31.51	-30.76
2021-22	0.68	651.63	2410.46	-180.13	-179.45
	TOTAL	3146.79	10369.11		
				NPV	-580.39
	BC RATIO	1.325		IRR	-37%

The above table shows a cost benefit analysis of private corporation i.e. VRL. Following values of CBA we found from the financial data:-

1. B/C ratio- 1.325
2. NPV- 580.39
3. IRR- 37%

The B/C ratio is calculated by dividing discount benefits by the discount cost. B/C ratio of less than 1 shows a bad investment while a ratio greater than 1 shows a good investment. From the B/C ratio graph above it can be seen that Private Travel Bus Services has a greater ratio i.e., 1.375 compared to the MSRTC Buses having its ratio range 0.4879. It can also be noted that the B/C ratios of the MSRTC Bus Services is less than 1, showing a bad investment while the ratios of Private Travel Services alternative are all greater than 1, showing a good and better investment. The NPV as stated above is the value in the present of sum of money in contrast to some future value it will have when it has been invested at compound interest. It can be seen that NPV of the Private Travel Bus Services is far much greater than that of the MSRTC Services. It can also be noted that the NPV MSRTC Services is below zero (negative in value) which shows that the MSRTC Services is a bad investment in this case.

c) Cost allocation Model Formulation-

In the first and foremost step, we have gathered all the financial data of both the entities from their annual financial report. The data we have considered is from past 5 years. In addition to that, we have collected passengers responses regarding services and facilities these entities provided. Based on these two data sources we have made our analysis. For finding a concrete value to the analysis, we have formulated a equation to find out a factor of decision making. This factor helps to determine the sector in which to allocate the capital first. This will help to improvise services provided from corporation and increase their profit bookings. The negative responses are from those which are collected from passengers and cost allocated is related to the sector to which cost allocation is to be carried out. Greater the value of factor of decision making, prioritizing that service sector first.

Model Structure Formulation Procedure -In this, from the responses we gathered from passengers, we collected passenger's review on these three factors. Also they rated the services provided by MSRTC, with 1 being lowest and 5 being highest. We calculated the average negative responses, and formulated them with the cost factor to get a 'factor of decision making'.

The decision factor selects the factor or the service based on the amount of negative responses and cost allotted. It selects the factor which can be improved with least cost and which is responded highly negatively by the passengers. It postpones the factor which is less negatively and which requires high cost for improvement.
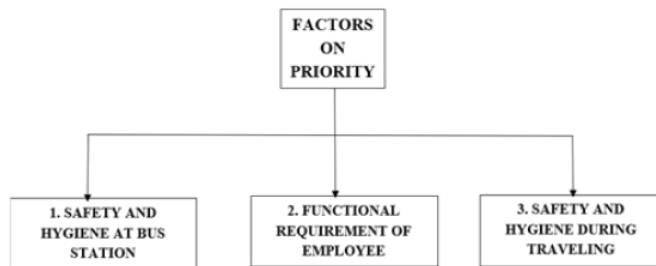

Fig.1 Priority order for cost allocation

So on the basis of decision factor for parameters, the cost should be assigned on the following priority,

1. Safety and Hygiene at bus station
2. Safety and Hygiene during traveling
3. Functional Requirement of employee

III. RESULT & CONCLUSION

For better operation of an industry, proper allocation of cost is necessary. For this purpose, a detailed analysis of a company's financial records is needed. The overall concept of allocation of cost is based on estimation, assumptions, demand forecasting and operation methods implemented. Estimation for any project should always be accurate or near to perfection. If a project has being underestimated capital for relevant operation and services can be hampered or cannot be given priority. On the other hand, if project is overestimated, unnecessary spending of capital will take place. From this study, we made an attempt to formulate some mathematical and analytical equation in way to find out the optimal way to allocate a given amount of cost. It does not only result in optimizing services based on priority but also it will make some profitable business for the concerned entity. The cost benefit analysis helped us to figure out the profitability of the businesses run by public and Private Corporation.

Lastly, the model present here gave us a profound result based on which the concerned industry can make amendments in their way of approach towards allocation of cost. It provide a list of priority based factors acted upon which can make their business run more profitable and comfortable to their end users.

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