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Economic Analysis of BRT Corridor a Case Study of Ahmedabad

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ABSTRACT

Traffic problems in urban areas increase due to rapid growth of population and with the increase in numbers of vehicles which result into excessive delays, travel times and reduction in speeds on urban road network. In order to reduce these problems there is a need for sustainable public transport system. The of promotion of Bus Rapid Transit (BRT) is a veritable option directed at improving the Service delivery in the public passenger transport particularly as it affects the most predominant form of transport mode in Ahmedabad – road transport. The essence is to relieve congestion, enhance mobility, time savings to passengers, reduction in accidents and improve the environment especially with regard to pollution in the Keshavbaug To Anjali area. There are incremental benefits and costs to a number of economic agents: government, private transporters, passengers, general public and unskilled labour. The impact analysis of Keshavbaug To Anjali BRT Corridor done in this study tries to measure all these benefits and costs from project covering a total distance of 4.1kms in Western Ahmedabad. The prime objective of this study is to establish the impacts of the BRT project and comparing BRT to Do Nothing scenario. In this study, the benefits and costs of converting a lane to a BRT lane will depend heavily on how such a project affects traffic speed, delay, and vehicle miles traveled, both in the mixed flow lanes and the BRT lane.

KEYWORDS: BRTS Ahmedabad, Financial Analysis, Economic Analysis

I. INTRODUCTION

Transportation is the backbone to the development of urban areas. It enables functioning of urban areas efficiently by providing access and mobility. Passenger transport has an overriding influence on the functioning of the city. With growth, the mobility needs increases. People's personal choices and freedom get expressed in increased ownership and use of personalized vehicles. The public agencies operating public transport systems often fail to restructure service types to meet with the changing demand pattern. As a result public transport becomes financially less viable, speeds reduce, and congestion levels increase. The transportation has also become a source of environmental problem. According to a study (World Bank, 1996), 70% of the world's urban population breathes unsafe air. It is also estimated that more than one billion people live in cities with unhealthy levels of suspended particulate matter. Every year millions of people die or suffer serious health effects from air pollution. As per a WHO study (2000), an estimated 3 million people die each year because of air pollution; this figure represents about 5% of the total 55 million deaths that occur annually in the world. Vehicles are major sources of urban air pollution and greenhouse gas emissions. There are economic consequences as well. As per a recent study of the World Bank, the costs to society due to air pollution in large cities of India, a part of which is direct productivity loss, was found to be nearly as high as one-tenth of the income generated in these cities from all economic activities.

The trends appear similar in most third world cities. The city of Ahmedabad, largest among all cities of Gujarat state, accommodating about 5 million people, has a registered vehicular strength of 1.4 Million. The rate of growth of vehicles has been about 9 to 10% per annum. Public transport situation has deteriorated rapidly over the past decade. The end result is visible in terms of increasing congestion on the city streets and the worsening of air quality

Among all infrastructures sectors, transportation sector plays an important role in economic development of the country.

II. Traffic scenarios in ahmedabad

Ahmedabad is having population of about 54.53 lakhs, highest in Gujarat and its decade's growth is 20 %. Ahmedabad has a large urban sprawl extending to the nearby rural areas. Urbanization is a determinant as well as result of economic development. It is a natural consequence of economic changes that take place as a country develops. Certain activities are better performed in certain density of agglomerations of people, while others are not. The urban population of Gujarat has mainly been concentrated in six major cities viz. Ahmedabad, Baroda, Surat, Rajkot, Bhavnagar and Jamnagar. Ahmedabad has a large urban sprawl extending to the nearby rural areas. Urbanization is a determinant as well as result of economic development.

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Vehical growth of last decade in Ahmedabad is shown in the fig.1

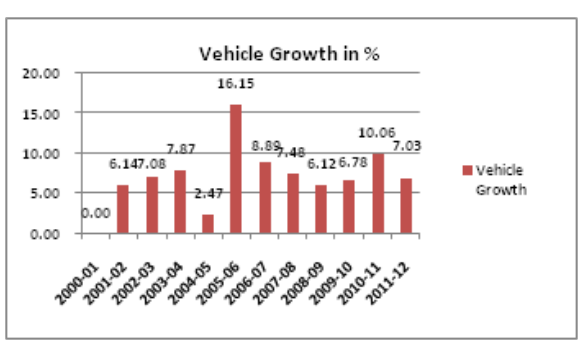


Figure 1 Vehicle Growth of Ahmedabad

III Need for the study

Transportation can be considered as an intermediate process involved in the production of goods and services in the economy. Any reduction in the transportation cost would result in the reduction of production cost of all goods and services. These would generate additional benefits to economy. Road improvements also bring about a reduction in transportation cost in terms of vehicle operating cost, Travel time saving cost, accidental cost, environmental pollution costs, etc. The constructed Bus Rapid Transit System is a high quality, ultra-modern and

passenger oriented rapid transit system to deliver fast, comfortable, economical and eco-friendly mobility to urban dwellers. By introducing the BRT system, the overall traffic flow has improved as significant shift from privatized modes towards BRT system is expected.

However, every project will also involve significant social costs in terms of utilization of scarce resources, the effect on local communities, natural environment and the huge public investment with significant benefits flowing to the society at large. It is imperative to undertake an economic analysis with an understanding that the project should be taken up only when it is significantly beneficial to society or the economy rather than the just a few individuals or institutions. So the viability of any project is first to be checked in terms of "Economic Aspect" and then in terms of "Financial Aspect."

IV. ObjeCTIVE OF STUDY

- The objective is to study concept, content and basic methodology of economic analysis
- To analyze the economic cost and benefits for the BRTS projects.
- It can also done to ascertain the acceptability of proposed BRTS project investment by evaluating economic cost and benefits.
- Cost and benefit time over a selected time horizon of 20 years and suggesting economic viable option.

V. SCOPE OF THE STYDY

- The study is restricted to understanding of different considerations used for cost benefit analysis and the methods for identification and evaluation of economic costs and benefits. It also involves the study of discounting and methods of comparison of costs and benefits. Finally sensitivity analysis is also involved to check the sensitive of the project to changes of different assumptions.
- To collect all the required data of CVC for intersections.
- To measure spot speed and average travel time on identified road.
- To do road inventory survey on identified corridor.

VI. Methodology

Difference between Economic Analysis and Financial Analysis

In the financial analysis one is concerned with the ways and means of financing a project (e.g. through taxes or toll) and financial profitability of the project. Economic analysis, on the other hand, is not concerned with the sources of finance, the availability of the funds and the allocation of funds. Funding of projects is a management decision. The construction of a toll expressway has to be examined on the basis of its cost and whether expected toll collections seem to be attractive enough. Such an analysis is financial in nature. Economic analysis, which concerns with the consequences to all segments of the nation, will still be necessary in such a case to establish its economic viability. Even after the economic viability has been established, the government may not take up the project due to lack of funds or because of the fact that the financial analysis has indicated that the returns are not attractive for the funding and recovery procedure selected.

Marginal Difference

When considering a number of alternatives, it is not sufficient to evaluate each of them against the basic "do-nothing" alternative. It is also advantageous to consider the marginal differences in costs and benefits between two alternatives and carry out incremental analysis to establish whether the increment in investment also yields justifiable incremental benefits.

Methods of Economic Evaluation

The Common methods of economic evaluation are:

- Net Present Value Method
- Internal Rate of Return Method
- Benefit/Cost Ratio Method

All the three methods are based on Discounted Cash Flow (DCF) technique of discounting all future costs and benefits to a common year.

Net Present Value (NPV) Method

In this method, the stream of costs/ benefits associated with the project over an extended period of time is calculated and is discounted at a selected discounted at a selected discount rate to give the present value. Benefits are treated as positive and a cost as negative and the summation gives the Net Present Value (NPV). Any project with a positive NPV is treated as acceptable. In comparing more than one project, a project with higher NPV should be accepted

Benefit – Cost (B/C) Ratio Method

There are a number of variations of this method, but a simple procedure is to discount all costs and benefits to their present worth and calculate the ratio of the benefits to costs. Negative flows are considered costs, and positive flows as benefits. Thus the savings in the transport costs are considered as benefits. If the B/C ratio is more than one the project is worth undertaking.

Internal Rate of Return (IRR) Method

The internal rate of return is the discount rate which makes the discounted future benefits equal to the initial outlay. In other words, it is the discount rate which makes the stream of cash flows to zero. If the internal rate of return calculated is greater than the rate of interest obtainable by investing in some other project the project is considered acceptable.

Comparison of various methods of Economic Evaluation

The methods of Economic analysis have their own advantages and disadvantages. Each of them may be more appropriate than the other in the given situation.

The benefit cost ratio suffers the following drawbacks:

It requires an assumption of the rate of interest, which should be somewhat related to the opportunity cost of capital. The opportunity cost of capital is very often not known and can be estimated only approximately.

The significance of B/C ratio is ambiguous and its relative value is difficult to understand and interpret.

It is at times difficult to decide which items should be treated as costs and placed in the denominator and which as negative benefits and placed in the numerator.

The Net Present Value also suffers from the disadvantage that a discount rate has to be assumed initially. It is much simpler computationally when compared to the internal rate of return method.

The Internal Rate of Return avoids the necessity for selecting a discount rate initially. The rate which is derived as a result of the computations can be easily compared with the market rate of interest, which is familiar. Its disadvantages are that the calculations are tedious and a solution can only be found by trial and error, and it may sometimes be misleading in comparing projects having different lives and streams of benefits.

VII. CONCLUSIONS

Our analysis compares a No Build baseline alternative with a BRT alternative that involves taking a mixed flow lane from a three lane arterial and using it for dedicated BRT. The analysis involves defining a number of assumptions regarding the physical characteristics of facility, its traffic controls, traffic volume, and base travel characteristics.

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