

Performance Evaluation of Bus Rapid Transit System [Reviews]

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Abstract— Bus mass rapid transit System (BRTS) is an innovative, high capability, lower price transport solution which will considerably improve urban quality. transport System in most Indian cities is rapidly deteriorating due to the increasing travel demand and inefficient transportation. There square measure numerous issues connected with transport such tremendous increase in range of accidents, Environmental degradation, Congestion, Overcrowding as a result of inadequate system, Frequency of service and schedule isn't strictly adhered. the matter of pollution, safety and unskillfulness have reached at a awful level in most of the key cities in Bharat as a result of intense growth of its population -both of individuals and motorcars, combined with inefficient transport system and poor social control of environmental laws etc. Thus, there's a good have to be compelled to guarantee clean, efficient, affordable, effective Associate in Nursing safe public transportation and for this Bus mass rapid transit System might become an acceptable answer. Bus mass rapid transit (BRT) Systems have emerged joined of the necessary mode of transport. they're Motorized Transport relatively versatile, simply accessible, and economical and additionally price effective in terms of having the ability to move an outsized range of individuals (rather than vehicles). BRT systems will simply be custom-made to community wants and incorporate progressive, inexpensive technologies that lead to a lot of passengers and fewer congestion. Performance improvements of BRTS is required to be done to overcome the above effects. This can be measured and evaluated by various tools like; BEAD tool, SPSS and various kinds of surveys. In the present study performance evaluation of BRTS is discussed.

Key words: BEAD Tool, Performance of BRTS, BRTS benefit, BRTS Problem, Performance evaluation, Public transport

I. INTRODUCTION

A 'smart city' is an urban region that makes optimal use of resource to better control and operations which ensures competitiveness, sustainability and quality of. Consequently, the government has now realized the need for 100 smart cities in India in urban areas [MoUD, Draft report, 2016]. However, the development of smart cities should be in such a way so that it provides optimal use of available transport facilities. Bus rapid transit system (BRTS) is a key component which plays a key role in development of smart cities in any developing countries including India from social as well as economic point of view. It is a most cost-effective, high capacity, comparatively flexible, easily accessible and innovative system that can significantly improve the performance of transport system in urban and suburban environments. At present there are number of BRT systems running in various Indian cities like Delhi, Ahmadabad, Pune, Indore, Bhopal, Jaipur, Surat and Rajkot . However, in past decades, rapid socio-economic

development and reforms caused the rapid increment in urban population and gradual increase in per capita income resulting into increasing the growth of private vehicles in urban areas. It is observed that almost all developing countries including India faced problem of congestion, delay, accident and pollution due to intensified growth of private vehicles. Hence, in most of Indian cities due to cost from congestion and delay have a huge economic loss of individual as well as bus rapid transit operators both. Therefore it is necessary to evaluate the comparative performance of BRTS in existing cities to how well it is providing transport service to the public in the area served, and provides valuable information based on which important operating decisions can be taken. Hence, this study presents performance evaluation for BRTS in smart cities using various on Board survey like Travel time survey, Delay time Survey , Passenger Frequency Survey, Public opinion Survey and it helps in providing smart mobility, smart route connectivity, smart accessibility and smart traffic management into the future while considering economic, social, and environmental needs.

II. OBJECTIVES

- To access the present performance of BRTS
- To suggest performance improvement measures for BRTS

III. RESEARCH STUDIES

A. Potential of Bus Rapid Transit System for Million Plus Indian Cities: A Case Study of Janmarg BRTS, Ahmadabad, India

In this they have measured the impact of BRT System on Ahmadabad's transport sector and the changes that can be brought about by introduction of BRT System in other cities. They found that BRTS Ahmadabad has improved access for local riders and advanced public transportation systems while reducing the environmental impacts of transportation. They also discuss the characteristics of BRT like provision of dedicated lanes, frequency of operation. BRTS have more flexibility compared to light rail and BRT routes can be adjusted and rerouted over time. The case study is Janmarg BRTS, Ahmadabad. As Ahmadabad has a well-developed ring radial structure, no single mode is adequate to meet the mobility needs. Both the phases of BRT are so designed, that they don't overlap the areas in which Ahmadabad Municipal Transit Service is provided. Janmarg has also proper feeder systems which feed people for the running of BRT system. In Ahmadabad Pilot project of 5 corridors on phase-II is selected for case study. They identified parameters like traffic impacts, social impacts and environmental impacts. Traffic impact parameters analyzed are, traffic composition, peak hour traffic flow and change in average speed in the corridor. In social impacts the

parameters are impact on road safety and accidents. In environmental impacts the parameters are Impact on air quality in that area and change in SPM, CO, NO levels. Traffic flow study is carried out to understand the efficiency level of the traffic system and to correlate with the proposed capacity. The traffic experiences a free flow which causes an increase in the average speed along the corridor. The user rating analysis shows that, the citizen whose the system are very much satisfied with the system. Due to BRT being implemented congestion decreased on the BRT corridor as private vehicles are shifting towards the public transport mode and there is a slight decrease in composition of the pollutants along all corridors.^[1]

B. Evaluating Bus Rapid Transit (BRT) Corridor Performance from Ambedkar Nagar to Mool Chand, Delhi Final Report

In this research they have studied analyses the performance of Delhi BRT corridor from Ambedkar Nagar to Moolchand after conducting various surveys like classified volume study at intersections, queue length and saturation flow studies, pedestrian volume count, Occupancy surveys, parking surveys, Speed and Delay studies, Spot speed studies, Opinion Surveys, Fuel consumption studies and Efficacy analysis of allowing other vehicles to ply on the BRT lane on experimental basis. They used parameters like Traffic flow, Passenger flow, Speed, Modal split, User rating of corridor, Road crash scene on BRT corridor etc. to evaluate the performance of corridor. A comparison of mid-block section volumes comparing BRT and Non-BRT sections. From the, it is obvious that the maximum traffic volume of 1,29,150 vehicles in 16 hours was observed on ShiekhSarai to Chirag Delhi section whereas the minimum traffic flow of 55,205 vehicles on Ambedkar Nagar to PusphaBhawan Section. In the case of adjoining non-BRT sections, the maximum traffic flow of 74,450 vehicles in 16 hours were observed at AurobindoMarg near Yusuf Sarai. From these results, it can be observed that the traffic flows on non-BRT sections carry some what comparable traffic flows. Bus passenger load is higher on BRT compared to adjoining non BRT routes. The share of private on BRT is about 80% and catering 45% of passenger share whereas about 78% of private vehicles catering to 54% share of passengers on non BRT corridor, which clearly indicates that even the lesser percentage share of private vehicles can cater more percentage share than BRT corridor. Even under the mixed traffic conditions, the percentage share of passengers loads are better off on Non-BRT conditions. There is 3% increase in average speed on BRT corridor. The corridor has been rated between 'average' to good compared to 'before' BRT scenario which was ranging between bad" to „average". The average of maximum queue length is longer during normal BRT operation. The road crash data shows that there is an increase in accidents after the implementation of BRT.^[2]

C. Measuring Public Transport Satisfaction from User Surveys

A survey was conducted among public transport users in Amman, the capital of Jordan, in order to measure their satisfaction with the services provided. The surveys were carried out by boarding operative buses, minibuses, and jitneys on working days and interviewing randomly selected

passengers. Therefore, the respondent population corresponds to all types of transit users in the city. Regular taxis were not included in the sample, due to their high cost; making them categorized as a form of private transport. The survey consisted of two parts; the first part contains general questions about gender, age, occupation, and the most regularly transit mode used. The second part is the major part of the questionnaire which consists of eighteen travel attributes. In previous literature, the most relevant features of the transportation system regarding the user satisfaction were found to be: trip duration, reliability, fare, network connectivity, information, comfort, safety, accessibility, and staff's behavior. Besides those, environmental impacts and sustainability have been considered recently and last they conclude The total average of satisfaction for each mode of transportation shows that the users of buses are the most satisfied, followed by the users jitneys, and minibuses, respectively. However, the overall average of satisfaction reflects that generally all users are not sufficiently satisfied with the transit systems, since even the highest score of (101/180) translates to merely 56%. It is necessary to increase user satisfaction through improving the public transport system in Amman. These improvements will make the city more sustainable and reduce the use of private cars in the future. High quality transit services will maintain existing users and attract new passengers. Nonetheless, public transport system enhancements will lead to resolving problems such as: traffic congestion, accidents, traffic noise, air pollution, and fuel consumption.^[3]

IV. FUTURE SCOPE OF WORK

In the present reviewed paper various surveys like travel time survey, delay survey, cost survey, load factor analysis has been introduced to measure the performance of BRTS. This can be taken further by introducing computer based programming like BEAD tool, SPSS software.

V. CONCLUSION

- 1) Traffic impact parameters analyzed are, traffic composition, peak hour traffic flow and change in average speed in the corridor.
- 2) Traffic flow, Passenger flow, Speed, Modal split, User rating of corridor, Road crash scene on BRT corridor etc. to evaluate the performance of corridor.
- 3) The surveys were carried out by boarding operative buses, minibuses, and jitneys on working days and interviewing randomly selected passengers.

Bus public transit System (BRTS) is associate degree innovative, high capability, lower value transport resolution that may considerably improve urban quality. India presently incorporates a range of operational BRT systems and far a lot of underneath designing & some square measure under construction. so it's necessary to judge the performance of BRTS in existing cities to however well it's providing transport service to the general public within the space served, and provides valuable info supported that vital operational choices can be taken for implementing the BRT systems for Indian cities. The performance of BRTS in India and thus are useful for researchers to boost the surroundings in Indian cities by shifting quality from the

personal mode of transport towards a lot of economical and safe transport system

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