



Performance evaluation of Bus Rapid Transit System (BRTS) in a smart city

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Abstract : Bus Rapid Transit System (BRTS) is an innovative, high capacity, lower cost public transport solution that can significantly improve urban mobility. Public Transport System in most Indian cities is rapidly deteriorating because of the increasing travel demand and inefficient transportation system. There are various problems related with public transport such that tremendous increase in number of accidents, Environmental degradation, Congestion, Overcrowding due to inadequate system, Frequency of service and schedule is not strictly adhered. The problem of pollution, safety and inefficiency have reached an alarming level in most of the major cities in India due to unabated growth of its population -both of people and motor vehicles, combined with inefficient public transport system and poor enforcement of environmental laws etc. Thus, there is a great need to ensure clean, efficient, affordable, effective and safe public transportation system and for this Bus Rapid Transit System could become an appropriate solution.

Index Terms - BEAD Tool, Performance of BRTS in Smart City, BRTS benefit, BRTS Problem, Performance evaluation

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.

II. OBJECTIVES

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

Characteristics of BRTS:

- Segregated right of way
- Constructed on at grade level, easy to built up
- Inexpensive as compared to metro rail
- Automatic tracking of buses available
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III. Problems related to BRTS

According to Agarwal P.K et al. [3], problems related to public transportation systems are as follows: International Journal of Management, Technology And Engineering Volume 8, Issue X, OCTOBER/2018 ISSN NO : 2249-7455 Page No:1869

1) Design issues: BRT System occupies space on equitable basis for almost all type of vehicles, but introduction of this system tends to increase traffic problems like congestion, lining up of vehicles at junctions in motor lane. During peak hours, sometimes there are major delays and congestions especially at junctions.

2) Traffic Signals: Traffic flow is not constant during whole day, as a result traffic signals are unable to discharge flow and creates long queue of cars and other vehicles in motorized lane as well as bus lane. For now, only static traffic signal is installed in BRT corridor and many times it is shifted to manual control. Manual control can operate only single phase at a time which is not sufficient.

3) Environmental conditions: When BRT System was introduced, people residing around BRT corridor were promised that this system will reduce air pollution, but due to use of high polluting diesel buses pollution is increased and are not environment friendly. Trees were cut down to introduce the BRT corridor, but later no trees were again planted in median and around BRT corridor.

4) Land acquisition: At many places existing carriageway was too narrow to construct new BRT corridor. Due to consequent widening and construction of stations and depots, additional land acquisition was unavoidable and as a result some structures need to be cleared.

IV. 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.

Performance Evaluation of BRTS

The past studied of Delhi & Pune BRT Systems and identified some common problems in both the operating systems. Some recommendations were suggested to improve the Pune BRT System so that it can have a better result and avoiding shutdown as in case of Delhi BRT System. In Delhi, total 6 corridors were proposed with a total length of 310 km to be completed by year 2020.

To avoid shutdown of Pune BRT System some recommendations were suggested like integration of existing system with new system to cut down use of private vehicles, to decrease cost of tickets to attract lower- and middle-income group people, pedestrian access improvement, etc.

Some of the improvements needed for Pune BRT System were to conduct surprise visit and inspections to establish good control and discipline in people who manage the BRT System and passengers who use them. Traffic signals at every junction create traffic jams and resulting in increase travel time.

The impact of BRT System on smart city of Ahmadabad's transport sector, Ahmadabad BRT System has improved access for local riders and reducing environmental impacts of transportation. Various characteristics of BRT has been discussed like dedicated lanes, frequency, etc. As compared to rail transit, BRT is flexible in terms of route adjustment and re-routing over time. Both the phases of BRT are so designed that they do not overlap each other in which Ahmadabad Municipal Transit System (AMTS) is provided and it also has proper feeder system to feed the passengers.

Traffic flow study is carried out to understand level of efficiency and also to correlate with proposed capacity. User survey analysis shows that, passengers who use the BRT System are very much satisfied and private vehicles are shifting towards public transport mode. After implementation of BRT System there is slight decrease in composition of pollutants around the corridors. Shah S.D. et al (2015) [7] analysed performance of Surat BRT corridor from Udhna Darwaja to Sachin GIDC after conducting various surveys like questionnaire survey, on board BRTS survey and para – transit survey.

2 wheelers and auto-rickshaw were mostly used for trip and over 60% of trips belonged to job or work purpose while study or social based trips were to be second on the route. According to survey, labours preferred International Journal of Management, Technology And Engineering Volume 8, Issue X, OCTOBER/2018 ISSN NO : 2249-7455 Page No:1870 use of shared auto-rickshaw and 2 wheelers were mostly used for job or work purpose to travel for short distances. 60 % of passengers were not willing to use BRTS during morning and evening peak hours and were shifted to either auto-rickshaw or private vehicles. Around 65 % passengers rated accessibility and connectivity of BRTS as poor and around 25 % rated as average. Over the selected corridor BRT bus completed the cycle earlier as that of auto-rickshaw.

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.
4. Bus Rapid Transit System (BRTS) is an innovative, high capacity, low cost public transport solution which can improve urban mobility rapidly. In India currently, there are many operational BRT Systems and many more under construction & some are being planned.

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