International Research Journal of Management and Commerce
ISSN: (2348-9766)
Impact Factor- 5.564, Volume 6, Issue 01, January 2019
Website- www.aarf.asia, **Email** : editor@aarf.asia , editoraarf@gmail.com

CRITICAL EVALUATION OF BUS RAPID TRANSIT SYSTEM IN INDORE

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ABSTRACT

BRTS Indore is undoubtedly one of the best project for the city and I-BUS is best mode of transportation these days In Indore, In fact the daily travelers in I Bus had been increasing in the recent past. The services of AICTSL provides regular connectivity of buses in Indore and it is also one of the fastest mode of transportation in the city during the peak traffic hours, but the real question arise that was the project able to fulfil all the promised objectives at the time of project proposal for BRTS in Indore. This paper represents real present scenario of BRTS Indore. The Paper contain Critical overview on BRTS Indore Right From Inception to completion of the project.

Key Words: BRTS, AICTSL, I-BUS

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, congestion levels increase and the transportation becomes 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.

Around the world, cities face enormous problems of transport sustainability. Rapidly increasing populations and vehicle use have created gridlock and sprawl, even in very poor cities, as well as rapid growth in oil use and unacceptably high levels of air pollution. This project shows how better bus systems, incorporating new approaches to system design and new technologies, can put urban transportation on a more sustainable path. It covers the area: new bus systems in Indore and Bhopal that are tackling very difficult traffic-related problems.

While many new technologies are emerging to improve buses, perhaps the most important story to be told is that the systems in which buses operate can be dramatically improved. Bus transit can be a premier form of urban travel. A new paradigm in delivering bus services, becoming known as bus rapid transit, is being developed in a number of cities, particularly in Latin America, and shows promise for revolutionizing bus systems around the world. Getting buses out of traffic, increasing their average speeds, improving their reliability and convenience, and increasing system capacities can ensure high ridership levels and increase the profitability of systems. All in all, the package of improvements described in this book, and being tested and implemented in various cities around the world, holds the potential to make all cities more efficient, cleaner, less gridlocked and more sustainable. But it will not be

easy. It will require technical assistance and the transfer of experience and learning from successful cities to those just Starting out. Perhaps most of all it will require political will.

The problem of pollution, safety and inefficiency have reached at 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. Bus Rapid Transit (BRT) Systems have emerged as one of the important mode of public transport. They are Motorized Transport comparatively flexible, easily accessible, and efficient and also cost effective in terms of being able to transport a large number of people (rather than vehicles). BRT systems can easily be customized to community needs and incorporate state-of-the-art, low-cost technologies that result in more passengers and less congestion.

LITRATURE REVIEW

Pratt and Lomax (1996) have proposed a set of indicators based on the objectives of the bus based public transport system that professionals desire to evaluate. Though these indicators tend to be specific to the end use of the measures, there are often debates whether multiple indicators or a single indicator is useful in evaluation. For example, maximized ridership within an allowable deficit unit may be used as a measure of transit performance (Talley and Becker 1982). Similarly, other single measures include cost per passenger or per passenger mile (Nash 1978;Patton 1983). However, performance measures may respond to different intended recipients of benefits of the system or may respond to the objectives of various "publics" (Fielding et al. 1985).

Ribiere et al. (1999)dentified customer satisfaction with hospital information systems in terms of timeliness, accuracy, and completeness. Yet another study on satisfaction with hospital services included communication with patients, competence of staff, staff demeanor, quality of the facilities, and perceived costs (Andaleeb 1998)

(Diaz, R.B., et al., 2004), (Kittelson& Associates, Inc., et al., 2007), and (Levinson, H.S., et al., 2003) Running ways are the key element of BRT systems around which the other components revolve since running ways serve as the infrastructural foundation around which the other elements function. Moreover, it is the running ways that should allow for rapid and

reliable movement of buses with minimum traffic interference to provide a clear sense of presence and permanence. The types of running ways for BRT service can range between mixed traffic operation and fully grade-separated busways.

Of particular importance to consider when implementing bus rapid transit is its deployment on conventional highways including arterials and freeways because of the need to integrate BRT within an existing roadway infrastructure with specific land use patterns. Such integration may require changes including removal of peak period parking to allow for a bus-only travel lane, replacement of conventional traffic signal control systems with transit signal priority systems, or removal of an existing curbside travel lane during peak periods to allow for a bus-only travel lane. Moreover, such changes are likely to have impacts – possibly negative impacts from certain stakeholder perspectives – that need to be examined.

A 2004 TCRP report, "Transit-Oriented Development in the United States," explored Boston's TOD history, including a brief review of TOD prospects around the planned Silver Line Waterfront BRT service. The report found that the Waterfront had good potential for TOD dependent on the quality and organization of the new transit service, which had not yet begun operations. The report detailed the city's commitment to making the Waterfront a TOD corridor, with supportive parking policies and public investments.

Pucher et al. (2005) describes the public transport reforms in Seoul and assesses their impacts on safety, speed, costs, passenger levels, and overall customer satisfaction.

Wright and Hook (2007) A report by World Resources Institute (2010) brings out the definition of the BRST: describe BRTS as a mode of transport that enables efficient transport. More specifically, Levinson et al., (2003) describe the BRTS system as one that flexibly combines stations, vehicles, services, running ways, and intelligent transportation system (lTS) elements into an integrated system. BRTS, as a concept in modern transportation has been identified with the potential of higher quality experience as compared with the traditional bus operations due to reduced travel and waiting time, increased service reliability and improved usability (Diaz, et al., 2004) and according to PNUMA, 2010, the potential of improving local and global environmental conditions. The report beings out that as economic priorities and sustainable development are being balanced, the BRT projects should be prioritised especially in the developing countries where infrastructure finance options are more limited and rapid motorization is worsening the urban problems of congestion, pollution, road traffic injuries and deaths.

(Hook et al. 2012) Different measures use different sets of indicators. This is also dependent on its end use and the availability of data types used in evaluation. One should primarily base indicator selection on the end use of bus performance measures. Selection of indicators is often based on the availability of measurable or observable data. A wide gap frequently exists between end use and data availability to assess performance because either relevant data are not observable or is too expensive or difficult to collect (Hook et al. 2012). Thus, developers of performance measures often use proxy indicators. Since many measures use proxy indicators (Hook et al. 2012), because they are cost effective, there efficiency in replacing appropriate direct indicators remain open to evaluation and debates.

Two types of data exist, objective and subjective (Institute for Transportation and Development Policy 2011). Objective data has two sources. One source involves data collection devices, i.e., recorded data (Mulley et al. 1998), and the other source comes from validated model usages (S G Architects and Fazio Engineerware 2012). Analysts primarily use recorded data in operational studies. Most bus operational studies use generated data from ticketing devices, fare collection devices and speedometers. Since an abundance of recorded data exists in bus operational studies, one directs most bus benchmarking efforts towards the benchmarking of operational performance. Subjective data uses bus user and societal derived indicators that are often either proxy to operational indicators or qualitative in nature, creating doubts on the accuracy of such measures.

(CEPT, 2012) The study done by CEPT University, in which 1040 BRTS users were surveyed. From the study, it is concluded that the BRTS has failed to attract poor & affluent section of the society. Overall, BRTS serves mainly those from the middle income group most of whom are captive public transport users. From the study, it is evident that the major shift of users was from AMTS which is 47%. Only 12% users had actually made switch from private vehicles to BRTS.

(Gandhi 2013) To overcome these deficiencies in performance evaluation of bus based public transport systems, a spreadsheet based modelling tool (S G Architects and Fazio Engineerware 2013) has been developed. This tool provides quantitative assessment of bus performance against multiple indicators. These indicators respond to the requirements of three stakeholders in a public transport system. These are the society, passenger and the operator (Agarwal 2011). The tool has two main components. One of these is the modelling engine which predicts performance in terms of commercial speed, passenger speed, capacity,

etc. and uses design, planning and context related inputs such as operation type, station type, average trip length etc. The outputs of the modelling engine include prediction of commercial speed, passenger speed, journey time, capacity, etc. Second component is the evaluation framework. Outputs generated by the modelling engine are used as inputs in the evaluation framework (S G Architects and Fazio Engineer ware 2012b). Here performance against ten critical indicators is evaluated and aggregated in to an overall performance score. Aggregation is based on individual indicator weights assigned using inputs from different stakeholders representing passengers, civil society organizations (CSOs), operators and experts in public as well urban transport. These indicators and their categories have been listed below (Gandhi 2013).

1. Social Indicators

- Peak Bus Speeds (due to its impact on fatal crashes)
- Potential for Shift from Private Transport – based on passenger travel time comparison between buses (in BRTS) and private vehicles.
- Potential for retaining existing public transport demand by improving the performance of current bus system.
- Allowing universal access and barrier free mobility for primarily in terms of disabled friendly infrastructure and fleet.

2. Passenger Indicators

- Passenger speed or door to door travel time
- Total walk distance for passengers in a one-way trip
- Total delay to a unit passenger in a one-way trip

3. Operational Indicators

- Expected system capacity
- Expected Operational or commercial speed (Km/h)
- Average per station and junction delay to a unit bus in the BRTS

(Patel & Soni, 2013) BRTS is relatively newly introduced transport model in Ahmedabad. According to the research carried out, the satisfaction level of consumers using BRTS

depends on factors such as safety, comfort, time and money. BRTS users were found reasonably satisfied on these parameters. Overall satisfaction level was also found quite high.

(Mahadevia, Joshi, &Datey, 2013) It is commendable that there is 'network' thinking involved in the planning of BRTS and not 'corridor' thinking. With the expansion of the BRTS, the ridership is increasing and the service is becoming increasingly popular amongst the people of the city. Since the system became operational, both ridership and revenue has grown impressively. The system is being seen as a trademark of the city and is also used for marketing the city.

(Rizvi, 2014) The system is enthusiastically supported by the city's residents and provides a genuine and operational transportation alternative for Ahmedabad, with plans underway for continued expansion. Ahmedabad has realized significant safety improvements recording a 28% decline in fatalities and 20% decline in accidents in the first year of BRT operationalization (Jaiswal et al., 2012).

(Chaudhari & Hajiani, 2014) According to the study carried out to analyse traffic impact of BRTS, it may be concluded that other traffic is largely affected due to BRTS. There is large speed reduction in other traffic which is running parallel to BRTS lane. For these problems, solution might be as to allow AMTS in separate bus lane (BRTS) because it affects the speed of other traffic in negative manner. AMTS buses and cars should be allowed in BRTS lane because there is a less frequency of BRTS buses.

(Bo, 2014) According to him, transport system on the middle of a street without significant expansion of the road is not good. A good transport system should ease traffic woes not escalate them. On some routes in Ahmedabad, BRTS has been expanded at the cost pedestrian and cyclist. Though Ahmedabad BRTS is impressive, it has to travel a long way.

(Patel & Makwana, 2015) From the study carried out, it is concluded that along with BRTS, most of the customers are using AMTS & personal vehicles as other mode of transportation. People prefer more BRTS than AMTS because of salient features of BRTS like timely availability, comfort, safety, security, announcements.

OBJECTIVES:

Purpose of this study, Evaluate the feasibility of implementation after launch of the Project, Identify the major problems in implementing BRTS Project, Suggest the strategies for the effective and successful implementation of the project.

GAP ANALYSIS

BRTS Indore is undoubtedly one of the best project for the city and I-BUS is best mode of transportation these days In Indore, In fact the daily travellers in I Bus had been increasing in the recent past. The services of AICTSL provides regular connectivity of buses in Indore and it is also one of the fastest mode of transportation in the city during the peak traffic hours, but the real question arise that was the project able to fulfil all the promised objectives at the time of project proposal for BRTS in Indore. Let's discuss the projected objectives of AICTSL at the time of its BRTS project incorporation.

- **To increase the accessibility in the city:**

  Undoubtedly the Accessibility in the city had improvised to an extent but looking at the broader prospective and at a big picture the accessibility had been compromised in the major portion of the city, the objective of increase in accessibility dose not gives a clear picture unless the BRTS project is spread all over the city the conclusion about the accessibility cannot be clearly drafted out. The accessibility in the city depends upon various factors which BRTS failed to achieve due to which the objective of increased accessibility is under accomplished.sss

- **To increase the speed of transportation.**

  Speed of transportation had been increased with the BRTS project, where it used to take almost 45 minutes to reach Bhanwarkuan from Vijay Nagar now it's hardly taking 20 minutes. But the issue of major concern is that the speed of I bus only had been increased. What about the speed of the feeder buses which are a major service provider for the public transportation even today and the I bus is able to cut the time in transportation because there are only a few I buses, the picture will be very same when the I bus will be used for replacement of the feeder bus service. The speed of private transportation on the other hand had been drastically compromised where it used to take 10 minutes to reach Industry House from Vijay Nagar now it's taking almost 20-25 minutes from two wheeler depending upon the traffic condition. Conclusively speaking the BRTS had not increased the speed of transportation but it had hampered the Speed of transportation in various places of Indore in which Industry House and LIG Square are the major concern.

- **To reduce the cost of public transportation and make it accessible to people of all the economic class**.

  The economic class' accessibility was a major target for BRTS by aiming the cost reduction of the public transport, but the naked reality is that the I bus is still a dream for the economic class people and is widely used by the working class and students to reach to their respective work place and the economic viability of I bus is also bit less than the feeder buses. The fare starts from Rs. 10 while in the chart the fare was described according to KMs, like the fare promised for 2 KMs of journey was Rs. 05 only but the fare actually charged is just double to it which is a major area of concern for the daily wagers and the Lower Income group of society. In fact the students and the office goers had to pay 50-100% extra fare to get a place in the I bus.

- **To reduce the traffic congestion.**

  Inspite of removing the traffic congestion the BRTS had increased it the traffic jams nearby industry House, LIG, Palasiaetc are major concern. Before BRTS the traffic of indore was facing problem but now the situation had been exacerbated the corridor provide traffic free way for I bus but the private vehicles have to face a lot of problem. That was the major concern which can hamper the whole project progress of BRTS in indore. Most of the offices are located nearby Regal thus a lot of passengers have to go from industry house and crossing industry house during the peak traffic hours is next to impossible due to which the situation of jams arises many times.

- **To popularize public transport and reduce the dependability over private vehicles**.

  Although the concept of new in the city and it is quite popular but the private vehicle had increased in comparison to previous times. I bus is not capable yet to provide the replacement of feeder buses then expecting it to replace the feasibility of private vehicle is some thing to dream about, unless the BRTS corridor is expanded to the outskirts and stretch of cities the dream will be dream, and the utility of Private vehicles will be very same.

- To improve the traffic management in the city.

  Traffic Management had been improvised and special credit goes to Traffic Police of Indore as they are performing their duties to great extent but giving credit to BRTS &

I bus concept will be bit too early as the traffic management will be completed when the Signals will be installed in every crossing which is yet to be done.

There are some other projected plans of AICTSL at the time of its BRTS project Incorporation. Actually these are indicative timeline's which is given by the AICTSL but work is not completed on projected date and some of the work still incompleted.

AUG 2012

- Bus operator finalized
- Prototype bus from Corona received and feedback sent
- Tender Automatic Sliding Gates floated
- Drawings for Bus Workshop finalised
- Tender for ITMS on BOT model
- Commence work on Branding and Outreach

SEPT 2012

- Agreement with bus operator
- Receive first lot of 8 buses from Corona
- Finalize contractor for Automatic Sliding Gates
- Finalize contractor for construction of Bus Workshop
- Hold ITMS tender-bid meeting
- Complete 50% work for Branding and Outreach
- Complete corridor railing construction

OCT 2012

- Staff recruitment and training by operator
- Total 16 buses received from Corona
- Commence installation of Automatic Sliding Gates–Complete bus station construction
- Complete 50%construction of Bus Workshop
- Finalise concessionaire for ITMS tender

NOV 2012

- Start trial runs on BRT corridor using 16buses
- Total 24 buses received from Corona
- Complete installation of Automatic Sliding Doors

- Complete construction of Bus Workshop (100%)
- Vendor starts ITMS procurement
- Advertising contractor commences

DEC 2012

- Continue BRT trial runs
- Total 32 buses received from Corona
- ITMS vendor begins installing equipment
- Full system test run for streamlining operations
- Outreach efforts continue
- Advertising work continues

JAN 2013

- Launch of full passenger operations on BRT corridor
- Total 40 buses received from Corona
- ITMS project continues (full operation of ITMS by August 2013)

BRTS Project was planned to construct Six Lane Roads in Indore City. The Project was targeted to be completed by 2009. But, due to encroachments in various areas, political interference and many other reasons, even 50% of it is not completed. Hence, there is a need to evaluate BRTS Project critically and identify the reasons of success and failure of the same. After 2009 there are many dates proposed for the completion of BRTS project but still the work is incomplete. Ajit Nagar, retired chief engineer in PWD, has experience of overseeing several civic projects in the city. He says selection of the contractor company for such an ambitious project was wrong. Proper rate analysis was not done at the time of issuance of work order. This is clearly visible on construction sites.

The Indore BRTS in-principal was approved with an estimated cost of Rs 96 crore by the central sanctioning and monitoring committee under Jawaharlal Nehru National Urban Renewal Mission (JNNURM). Seven corridors were identified for developing the BRTS within the city for developing in phases. Other public transport routes, which would serve as feeder routes were also identified as per the comprehensive mobility plan.

The incomplete works comprise construction of five culverts and 23 bus stops, flyovers at BhanwarKuan and Naulakha, while work on one side of Palasia is yet to start, at Rasoma it started only recently

Construction of 21 bus stops by Indore Municipal Corporation. Contract for constructions has been given to BR Goal, who is not reported to have shown any interest so far. Bus stops will be at Rajeev Gandhi Square, Aditya Nagar, Indrapuri, Bhawarkuan, Holkar College, Zoo, GPO, MY Hospital, Geeta Bhavan, Palasia, Palasia Thana, Industry House, LIG Circle, Press Complex, Shalimar Residency, Orbit Mall, Vijay Nagar, Satya Sai School, Scheme 74, Shalimar Township, Scheme 78 and Lasudiya Mori l All the squares under BRTS are to be redesigned by the IDA. But this work has not begun. Initially, it was started at Naulakha Square but after opposition from the BJP, the rotary was left incomplete.

"The main reason behind inordinate delay in the BRTS is lack of proper sequencing of works. Besides, Tember (system to drain water) is incorrect. Width of the corridor should be uniform across the road but this is not the case here. Therefore, there should be a flyover at Palasia area." Pithampur industry association president Gautam Kothari is baffled by administration's inability to get encroachments cleared for the project.

" The BRTS project is progressing much faster in Bhopal compared to Indore. Here small hurdles are taking a lot of time to be cleared while in state capital the issue was resolved before actual construction work started.There should be flyover from Geeta Bhavan to LIG square as traffic flow is high there."

Jagat Naraya Joshi, former advisor of transport department in the state, has visited several cities to study BRTS projects and traffic system. He opines that length of the BRTS route in Indore should be longer.

Proposed dates for BRTS project completion:

S.NO.	DEADLINES	DATES
1	First deadline	31st Dec 2009
2	Second deadline	31st July 2010
3	Third deadline	31st January 2011
4	Fourth deadline	30thsep 2011
5	Fifth deadline	31st march 2012
6	Sixth deadline	30thsep 2012
7	Seventh deadline	31st Dec 2012

AB ROAD CORRIDOR (INFRONT OF DAINIK BHASKAR OFFICE)

FINDINGS

74.8% of the respondents have opined that BRTS will proved be an effective mode of transport for Indore city. Out of this data, it may be presumed that public in general of Indore city believe that BRTS mode of transport should be provided to the city in order to provide maximum benefit on account utility would be utmost.19% of the people have discarded the utility of the service, may be due to their negative attitude which has developed because of delay in the project media exposition etc.

42.9% of respondent have opined that I-BUS would match up standards of safety and security to a great extent. Out of remaining lot 34% have disagreed with this contention. However 23.3% of the respondents are neutral on this issue. Perhaps, they are not aware of what kind of safety and security majors will be taken up while launching I-BUS in the final stages. The situation seems to be quite hopeful in the eyes of public. When approximately half of the respondent believe in the system and hope for better quality of safety and security standards would be taken up by the authorities.

On this issue the researcher have observed that 10 corridors are required would be launched in toto. Where is so far only one corridor that is AB road is launched so far. Capping this aspect in view it can be safely assumed that most of the respondents are not fully aware of the coverage of I-BUSES. Only 26.9% of the respondents have agreed that I-BUS would be a convenient mode of transport to move anywhere in the city. Out of the total respondents

47.5% have replied that these buses would not be able to cover majority part of the city and as high as 25.6% are neutral on the subject. Looking to the speed of the progress in the matter all the 10 corridors would take a considerable time and hence till that time any success of the development would lead to positive attitude towards reply of this question.

Zebra crossing, it is a mode point is to weather passengers movement on the road would be affected or there would be ease of movement, if all the routes related to zebra crossing could be maintained by the authorities. However, looking to the existing situation only 40.12% of the respondents have reported that I-BUS would not affect pedestrian movement of the major squares. It may be reported here that project of this volume would have 21 squares or bus stops. On all the major hallmark spots in the city at this junction, it is difficult to comment weather pedestrian movement would be affected or not and it what degree. However it is felt that authorities would be quite serious on this issue it would like to maintain as much as possible zebra crossing disciplines. This believed that this point will be taken into consideration seriously by authorities. Nevertheless, the cost may be more but it is associated with the life of passenger and success of the project.

CONCLUSION:

It's always a matter of pleasure to consolidate, whenever a hard work done by sincerity and commitment is put into conclusion. BRTS- GAP analysis is one such work, which would be browsed, read, discussed and referred vary often- a feeling by the people involved in this work.

When the project report was given to our institute, although it was seen with a challenging and rewarding work, yet was conceived as a difficult report to proceed.

Indore BRTS project has been started with the experiences and views received from Latin America and seoal BRTS, it had a plus point in the form of Rajkot BRTS, an indianized BRTS working almost on the similar model.

Various reports were searched along with literature review from many organizations, like newspaper articles and media reports regarding its working. Whether BRTS would be successful or otherwise.

A considerable number of respondents i.e. 50 people were interviewed on a well-defined structured questionnaire. The views of respondents were very useful in finally interpreting

and submitting the findings of the report. The report has been submitted with major findings containing the significant parts of the report. These major findings require further analysis and exploration by the authority is concerned so that strength can be capitalized and weakness can be improved.

From the above account it is assumed by the researcher that project is suffered by teething troubles. This project being the very large in contents, vertically, horizontally and implementation. Naturally many flaws, weakness seem to be in surmounted but the ability and capability of BRTS should not be seen with suspection. Once two or three corridor works efficiently and effectively, the entire project would be welcome by public, authorities and the media. It may be added that if the project is successfully implemented in terms of its projection, Indore city would be seen as a leader for such projects and the beautification of the such city would not have any leaps & bounds. It is presumed that only one tenth of the project has been completed so far. But the remaining 90% will have experiences of early blockages. The way seem to be smoothened yet requiring support from all the corners financially, politically, and publically.

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