Evaluation of Factors on BRTS Usage in Indore

Satyakam Dube*

Dr. Sunita Jatav**

Gunja Thakur***

Prof. (Dr.) R.K.Gupta****

ABSTRACT

Indore, the largest metropolitan city of the state of Madhya Pradesh, is fast emerging as a centre of trade and commerce. It's a tier 2 city of India and is popularly known as commercial city of the state. Indore City Transport Service Corporation services in Indore has vastly distributed network of bus services. It connects almost every part of Indore with this network of buses.The Indore BRTS or Ahilya Path is the bus rapid transit system for the city of Indore, Madhya Pradesh by AICTSL also called i-Bus (Intelligent Bus), operational from 10 May 2013. The study analysed parameter of I-Bus facility avail by respondents in Indore city with 676 respondents based on demographic variables and factors of BRTS usage.

Keywords : BRTS, Customer Responses, I-Bus

INTRODUCTION

The Indore BRTS or Ahilya path is the bus rapid transit system for the city of Indore, Madhya Pradesh by AICTSL. It became operational from 10 May 2013. The Indore BRTS project started in 2007 under the JNNURM. It involves the participation of the Governments of India and Madhya Pradesh and the World Bank. Though it is not as advanced as the systems with feeder bus routes and advanced ticketing system but is an evolving system with these parameters in the pipeline.

Hidalgo and Carrigan (2010) states that BRT flexibly combines stations, buses, exclusive and segregated bus ways and intelligent transportation system elements into an integrated transit system with a strong brand that evokes a unique identity. BRT provides higher quality of service than traditional urban bus operations because of reduced travel and waiting times, increased service reliability and improved user experience.According to Saxena (2008) BRT systems can reduce travel times for their passengers by moving BRT buses out of mixed traffic and into exclusive, segregated lanes. Level and pre-paid boarding at stations along with high-capacity buses with multiple boarding doors help speed passenger boarding and alighting. Sophisticated traffic signal management and high frequency bus service can help to minimize passenger waiting and transit times.

Indore developed a systems approach to implementing the BRT system consisting of planning, management and control through the establishment of Indore City Transport Services Ltd (ICTSL).Indore is a typical tier-2 town in the central province of India, fast becoming a regional commercial hub in an economically booming state. The city has a population of over 2 million with no significant public transport. Among the multiple options available, the city started implementing a dedicated corridor based BRTS. The project was jointly mooted by the central, state and city authorities. However, the system encountered a range of problems, including conflicts and pulls between

* HOD, PGDM, Institute of Business Management & Research, IPS Academy, Indore
** Assistant Professor, Institute of Business Management & Research, IPS Academy, Indore
*** Assistant Professor, Institute of Business Management & Research, IPS Academy, Indore
**** Visiting Faculty, Symbiosis Institute of Operation Management, Nashik

multiple implementing agencies, delays in delivery of hardware and constructions, land acquisition and compensation, vested interests, public interest litigations and court orders.

REVIEW OF LITEATURE

Das (2007) states that urban transport problems in India are growing rapidly mainly because of increasing motorization. The major challenge for urban transport agencies in India is how to improve the current urban transport situation or at least prevent it from deteriorating further. Kim and Nangia (2012) did comparative study of India and China's national infrastructure sheds light on the current state of India's transportation infrastructure. They also explore the political factors that claim to have contributed to the nation's poor provision of road networks. In comparing it to China's method of anticipating demand, they argue that India's national philosophy of infrastructure provision as a social service during a critical growth period was detrimental to the economic welfare of the nation. In assessing the deplorable condition of India's transportation networks, they argue that it is not only a threat to the economy (e.g., hampering trade) but also to safety and community welfare (e.g., access to basic goods and services). While they attribute this current condition to a technocratic, top-down planning process, as opposed to a more political one, they claim that Indian officials have begun to adopt more promising strategies to address the underserved transportation needs of the nation.

Rees (1996) concluded that for sustainable development, the ecological footprint concept has received much attention as a potential indicator over the past years. Ecological footprint analysis is an accounting tool that enables us to estimate the resource consumption and waste assimilation requirements of a defined human population or economy in terms of a corresponding productive land area. Shukla (2013) says, "In modern cities, no one can even think of organized and planned development without having a modern public transport system. Indore residents are fortunate that public transport (BRTS) came to existence at the right time when the city started taking rapid strides in growth and development. The project will definitely be a key factor in Indore's growth in the long run."

Roy (2014) states that currently, the I Bus is slowly regaining ridership. Transit agency representatives report that with the addition of new buses, private automobile users are finding it less convenient to drive in the BRT lane. However I Bus will be able to improve traffic conditions for all travellers on A.B. Road.

AICTSL (2014) reported that cycle lanes could use the mixed lanes along with other riders. The BRTS bus stops would witness enhanced passenger amenities in the form of public information system, flap barriers, automatic ticket vending machines, message sign board etc. All these bus stops would be equipped with ATMs and an agreement has been done with SBI and a private agency involved in the installation of these machines. The ITS will be completely functional on the corridor. Other amenities like smart card, surveillance system and traffic management center at AICTSL building would start functioning.

OBJECTIVES

1. To analyse impact of factors on BRTS users in Indore.
2. To analyse impact of demographic variables on BRTS usage in Indore.

RESEARCH METHODOLOGY

The study was based on experimental and exploratory research investigates the relationship between demographic variables and factors of BRTS parameters with BRTS users in Indore. Customer perceived services on BRTS analysed on 12 variables on overall services provided by BRTS to passengers. Apart from that study included the following dimensions: gender, age group, income, occupation etc. A six point type scale, ranking from (1) Most Important (6) Least Important was used to developed questionnaire and rank was used to developed questionnaire. Tool for data collection was questionnaire and sample area was Indore, sample size was 676 users. A cluster random sampling involved grouping the elements of a population in the various clusters and then selecting the few clusters randomly. Tool for data analysis were Chi Square and Ranking Method.

VALIDITY AND RELIABILITY ANALYSIS

Reliability of data was necessary to purify before any supplementary analysis could be conducted. Scale decontamination process was conducted for testing reliability of the scale, internal consistency of the scale and validity of the data conducted. For the scale purification process, we have conducted Cronbach alpha reliability test by using SPSS.20. Cronbach's alpha statistic is widely used in thesocial sciences, business, etc. The theoretical value of alpha varies from zero to 1. However, depending on the estimation procedure used, estimates of alpha can take on any value less than or equal to 1, including negative values, although only positive values make sense. Higher values of alpha are more desirable. Some professionals, as a rule of thumb, require a reliability of 0.70 or higher (obtained on a substantial sample) before they will use an instrument.

Questionnaire was based on refinement of the 12-item instrument which was gathered from overall BRTS service separately with pilot sample of 60 customers. The respondents were distributed uniformly from customer based of respondents. Convenient sampling technique was applied.

Table 1: Reliability Statistics

Reliability Statistics		
Particulars	**Number of items**	**Cronbach Alpha**
Overall Items (BRTS Services)	12	.815

Table No 1 indicates that all 12 items used in schedule relating to challenges, opinion and feel appropriateness for during use of BRTS services have reliability alpha 0.815, overall that disclose cronbach alpha is stand in good status in terms of reliability of pilot survey result of overall BRTS Services.

HYPOTHESIS

The hypothesis may be defined as an assumption about the relationship between different variables. The research hypothesis is an analytical statement which has been tested by scientific methods that reveal an independent variable to some dependent variable. A formalized hypothesis is used to get the result in an experiment. The hypothesis to be tested for our study is stated as:

Hypothesis 01: There is no significant impact of factors on BRTS users in Indore.

Hypothesis 02:There is no significant impact of demographic variables on BRTS usage in Indore.

FINDINGS

Data collected were analysed through a series of validated tool sand procedures. The result soft he analysis are described in the following subsections:

Table 2: Demographic Characteristics of the Respondents

Basis	Number (General Public)
Age Group	
Up to 20 Years	58
20-25	332
25-30	124
30-35	56
35-40	36
40-45	24
45-50	14
50-55	6
55-60	22
Above 60 Years	4
Occupation	
Student	312
Service	244
Self Employed	82
Retired	14
Others	22
Gender Group	
Male	438
Female	234
Annual Income	
Up to 1 lakh	154
1-2	100
2-3	112
3-4	82
4-5	24
Above 5 lakhs	28

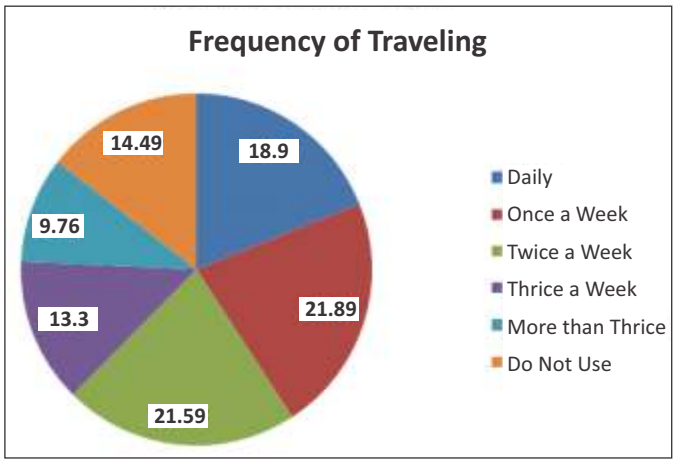
The data which was collected by different people is divided into different age group i.e. up to 20 years, between 20 to 25 years, 25 to 30 and so on. Another category is occupation which is divided into student, serviceman, self-employed, retired and others. Maximum respondents are from students. Questionnaire was also divided into annual income.

FREQUENCY OF TRAVELING BY BRTS

The frequency of BRT use is not very high for any of the income groups. Just 19 per cent of the users were taking a BRTS for more than 21 days in a month, that is, on a daily basis. A large proportion (21.89) used the BRTS up to once a week. This means, the BRTS still has a capacity utilisation issue. We however did not attempt to find out why the frequency of the BRTS use was so low in the city

Table 3: Frequency of Traveling by BRTS

Frequency of Traveling	%age
Daily	18.9
Once a week	21.89
Twice a Week	21.59
Thrice a Week	13.3
More than Thrice	9.76
Do Not Use	14.49



TESTING OF FIRST HYPOTHESIS

Reason Behind the Use of BRTS

H01has analysed in two parts, firstly by reason behind the use of BRTS secondly with factors wise. One such solution is bus rapid transit, a city-based, high-speed bus transit system in which buses travel on dedicated routes. BRT is already widely implemented in both the developed and developing worlds. Indore's BRTS came at a right time and with an intelligent transport system to be implemented, it can become a model for rest of India.

Table 4: Reason behind the use of BRTS

	1 (Most Imp)	2	3	4	5	6 (Least Imp)
Safety	312	168	72	68	30	26
Comfort	130	238	164	88	40	16
Pollution	66	124	182	124	98	82
Hassels of driving	56	54	86	178	190	112
Economical	102	46	136	160	176	56
Social Interaction	12	42	34	64	142	382

Table 5: Reason behind the use of BRTS

Reasons	Maximum Respondents
Safety	*Rank 1*
Comfort	Rank 2
Pollution	Rank 4
Hassels of driving	Rank 5
Economical	Rank 3
Social Interaction	*Rank 6*

In the above case, we have asked the public to rank between1-6, whereas rank 1 stands for most important and rank 6 stands for less important about the reason behind the use of BRTS. Various reasons behind the use of BRTS are safety, comfort of ride, pollution, hassels of driving on congested roads, economical etc. With the above analysis, we can say that for respondent's opportunity for social interaction is least important whereas, safety is most important reason behind the use of BRTS.

FACTORS USING THE BRTS

H01 Second part has been analysed with factors for using BRTS. This concept has incorporated the use of latest technology from Efficient land use policy to High-Tech Hybrid buses to GPS navigation and tracking in Inodre. Many big and old cities are finding it more sensible to have such a system which takes only a fraction of time and resources as compared to a subway/metro system but still has all the benefits. Along with benefits and many advantages, BRTS has its own limitations also. There are many factors which prohibited public from using the BRTS. Some of these factors are crowd, lack of frequency of buses, safety, to keep their social status, hygiene factor, not easily accessible.

Table 6 : Factors using the BRTS

	1 (Most Imp)	2	3	4	5	6 (Least Imp)
Crowd	346	150	64	42	48	26
Lack of frequency of buses	52	150	180	152	94	48
Safety	88	100	122	126	118	122
To keep my socialstatus	44	38	82	108	172	232
Hygiene	72	94	152	122	132	104
Not Easily Accessible	76	140	80	134	110	136

Table 7: Factors using the BRTS

Reasons	Maximum Respondents
Crowd	*Rank 1*
Lack of frequency of buses	Rank 5
Safety	Rank 2
To keep my social status	Rank 6
Hygiene	Rank 4
Not Easily Accessible	*Rank 3*

From the above table and analysis, we can conclude the respondents gave rank 1 i.e. most important factor which using the BRTS is crowd whereas they felt that to keep their social status and accessible they gave least important. Therefore, there should be more focus on crowd factor, so that maximum people can travel through BRTS.

TESTING OF SECOND HYPOTHESIS

Impact of BRTS

H02 has been analysed by Impact of BRTS demographic wise based on travel time saving, Local air pollutant emissions reductions, Road safety improvements reductions in fatalities and crashes, Increased physical activity/Offers healthy alternative as involves extra walking. High-quality bus rapid transit systems like all urban transport can affect the quality of life, productivity, health and safety of people living in cities. These impacts have been explored in varying depth in the existing research as travel time benefits, environmental impacts, public health and safety benefits and urban development changes.

Hypothesis 02: There is no significant impact of demographic variables on BRTS usage in Indore.

AGE WISE CHI SQUARE

The calculated value of Chi Square (2.12) is less than the

tabulated value 5.991 at 5 % level of significance. The null hypothesis has been accepted. Thus, we may say that the opinion"demographic variableshas not significant impact on BRTS usage" is independent of their age.

GENDER WISE CHI SQUARE

Here the calculated value of Chi Square (0.28) is less than the tabulated value 3.841 at 5 % level of significance. It supports the null hypothesis. It is inferred that the opinion that "demographic variables has not significant impact on BRTS usage" is independent of their gender wise.

DISCUSSION & SUGGESTIONS

BRT system performance can vary significantly depending on design characteristics and level of integration with other transport modes based on economic and environmental usage. For instance, corridors with exclusive, segregated bus lanes will be able to move more passengers in an hour than a corridor where buses operate in bus-priority lanes, which also permit access to mixed traffic. Bypassing lanes at stations enable express routes to skip certain stations and reduce travel times for some passengers. Bus speeds will be higher on corridors with fewer intersections. Fisher (2011) suggested that national and local investment decisions should be predicated on objective and transparent evaluation of alternatives including an assessment of costs and benefits to determine whether proposed projects represent a good use of limited resources. National transit investment schemes can help catalyse widespread adoption of BRT as an urban transport solution.

CONCLUSION

The aims of this research are to analyze impact of BRTS on commuters, non-commuters and other non-agencies in Indore. The conceptual framework of impact of BRTS is proposed by researcher is only the roadmap; it is not tested or implemented. This traces the history of the emergence of the idea of the BRT in the context of the existing transit problems in different cities of developing countries. The challenge for the exclusive model is its integration with the existing and regular bus or other transit services in a city.

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