

# “Expenditure, Investment or a Waste”

“Governmental implications for BRTS Project”

- A Study conducted in Surat city in 2017

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## **Abstract :-**

Fostering and boosting economic growth through infrastructural development has always been the radar focus of each government. With changing political scenario and fast growing economics globally India too has stepped ahead to modify and restructure its road network and set work. Balancing between the ever growing human population and vehicular population on road, the government initiated a strong public transport network as a option to encourage cheap and better means of commuting. Investments in thousand crores are made in various metros and cities in India with a confusing equation of its maintenance, popularity, usage and network connectivity. The researcher in this study has tried to dig out the scenario in Surat city in the year 2017 with respect to consumption of BRTS services by the Surtis in a very simple and concluding manner.

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## **Key Words:**

BRTS history, coverage, impact, advantages, public opinion.

## **Introduction:**

Road connectivity has been a significant indicator of a nations infrastructural growth and development. Apart from facilitate trade, commerce and industry, it fosters economic growth and reflects the governmental strategies towards its population. Drawing lessons from developed economics and copying the benchmark examples set by the fastest growing economy, Chine, India too is all set to create a spider network to integrated all roads and routes to enhance infrastructural growth. Economics globally quote that “ A developed economy is not where every citizen has a private vehicle but one where every citizen commutes through public means of transport”. Changing political powers have fostered and strengthened road infrastructure and network from time to time keeping this in mind. This research paper tries to study the growth, impact and satisfaction Quotant of the Surtis as far as the BRTS in Surat.

### **Review of Literature:**

BRTS is a multifaceted project which integrates land use and transport, various forms of public transport services as well as other motorized and non-motorized modes through various physical, operational and policy interventions to achieve the object of making Surat an accessible and competitive city.

The first BRTS in India is Rain bow Bus Rapid Transit system in Pune, started in 2006. Down trail followed by Delhi, Ahmedabad, Jaipur, Vijayawada, Rajkot, Surat, Indore, Bhubaneswar and major metro cities. Covering 19 states the fleet of Buses are as many as 23138 in Karnataka to 306 in Bihar. The Ahmedabad BRTS operated by Ahmedabad Janmarg Ltd., designed by CEPT University, is ranked as one of the best service in India. In Surat, BRTS covers 29.7 km. in phase I and 58 km. in phase 2 with the total project cost of Rs. 469.02 crores.

The major components cover Surat Navsari Road(10-20 km)

Dumas Resort- Sarthana Jakatnaka(19.7 km.), Bridges Flyover(2 X 4 lane), Pedestrian Subway(5), Bus stop (33), Terminal and depots(3), Interchange and stations (5) and ITS Applications.

### **Objectives of the study:**

1. The study aims to draw out the following derivations to sketch out a clear picture for the policy makers and SMC planners.
2. To find out whether the people in Surat depend on BRTS for coming or prefer other means and private vehicles.
3. Various occupational sectors equally prefer consuming BRTS through integrated network in each area to facilitate spider web network.
4. The connectivity of BRTS through integrated network in each area to facilitate spider web network.
5. Gender wise preference of BRTS.
6. Opinion of the Surtis to explore the mind-set towards governmental investment in BRTS project.

### **Research Methodology:**

The researcher through this paper has tried to study the impact of BRTS in Surat by conducting a primary survey in five major zones in Surat.- Udhna, Varachha, Athwa, Central and Adajan along with the support of secondary data. With the help of a scientific questionnaire a team of researchers after conducting pilot study have minutely worked on the field to collect accurate information from varied sections of the society.

The data base consist of 250 questionnaires. After testing the morality of the data the researcher has used non-parametric test as Wilcoxon. Sign Rank Test to derive conclusion. Suggestions are drawn out from the derivations to provide useful guidelines to policy makers for sustainment and development opportunities.

➤ **Test Procedure & Test Statistics**

Step 1: Subtract the hypothesis median from each observation, i.e. for each observation find  $D_i = X_i - M_0$ , if any  $x_i - M_0 = 0$  eliminate it from the calculation and reduce the sample size accordingly.

Step 2: Rank the absolute values of these differences from smallest to the largest i.e.  $|D_i| = |x_i - M_0|$ .

Step 3: Assign each of the resulting rank the sign of the difference whose absolute value yielded that rank.

Step 4: Compute  $T^+ = \text{Sum of the rank with '+' signs.}$

$T^- = \text{Sum of the rank with '-' signs.}$

$$\text{Here, } T^+ = \frac{n(n+1)}{2} - T_-$$

4. Ties:- These are two types of possible ties

- When  $X_i - M_0$  eliminate those observations from analysis.
- When 2 or more  $|D_i|$  are same then,  $|D_i|$  receives the average of the ranks.

Run Test:-

➤ **Test of Randomness: (Run Test)** (discrete)

A Run is defined as a sequence of like events, items or symbols i.e. preceded and/or followed by on event, item or symbol of different type or by none at all.

For testing the hypothesis of the randomness of the sample or sequence

- TEST STATISTICS:

R= Number of Runs

- Decision Rule:

We reject  $H_0$ , if there are too few or too many runs in a sequence.

For test of significance level 'd',

Reject  $H_0$ , if  $r \leq c_1$  or  $r \geq c_2$ ; where  $c_1 < c_2$

Where  $c_1$  and  $c_2$  such that,

$P(r \leq c_1 \text{ or } r \geq c_2) = \alpha$ ; where  $c_1$  and  $c_2$  are the critical values

Can be obtain for given  $\alpha$ - $n_1$  and  $n_2$  from the table

## Data Analysis:

1. Comparison between service of BRTS vs. other and own vehicles:-

Ho: The Data is normal.

H1: The Data is not normal.

### Tests of Normality

	Kolmogorov -Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
values	.429	221	.000	.610	221	.000

a. Lilliefors Significance Correction

P-value is  $0.000 < 0.05 (\alpha)$ , So we can say that we reject the H0 at 5% level of significance. So the data is not normal.

Hence the data is not normal, we applying Non-parametric Test.

Here we apply Wilcoxon sign rank Test for one sample,

Wilcoxon sign rank Test:-

Hypothesis:

Ho: People depend on BRTS service.

H1: People depend on apart from BRTS service (i.e. other and own vehicles).

### Statistics

values		
N	Valid	221
	Missing	0
Median		1.0000

Therefore, Median is 1.

T+=	68
T-=	0

tcal=	min(T+,T-)=	0
ttab=	TINV(0.025,67)	2.292891

Tcal	<	ttab
0	<	2.292891

Hence we can conclude that, We reject the Ho at 5% level of significance, so we can say that People depend on apart from BRTS service (i.e. other and own vehicles).

1. Occupation wise Comparison:-

Ho: The Data is normal.

H1: The Data is not normal.

**Tests of Normality**

	Kolmogorov -Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
code	.323	211	.000	.578	211	.000

a. Lilliefors Significance Correction

P-value is  $0.000 < 0.05 (\alpha)$  ,So we can say that we reject the H0 at 5% level of significance. So the data is not normal.

Hence the data is not normal, we applying Non-parametric Test.

Here we apply Wilcoxon sign rank Test for one sample,

Ho: Occupation wise BRTS is insignificant

H1: Occupation wise BRTS is significant

**Statistics**

code		
N	Valid	211
	Missing	0
Median		1.0000

Therefore, Median is 1.

T+=	2162
T-=	0

tcal=	$\min(T+,T-)=T-=$	0
ttab=	TINV(0.025,79)	2.284926

Tcal	<	ttab
0	<	2.284926

Hence we can conclude that, We reject the Ho at 5% level of significance, so we can say that Occupation wise BRTS is significant.

1. Area wise Comparison:-

Ho: The Data is normal.

H1: The Data is not normal.

### Tests of Normality

	Kolmogorov -Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
code	.220	221	.000	.805	221	.000

a. Lilliefors Significance Correction

P-value is  $0.000 < 0.05$  ( $\alpha$ ) So we can say that we reject the  $H_0$  at 5% level of significance. So the data is not normal.

Hence the data is not normal, we applying Non-parametric Test.

Here we apply Wilcoxon sign rank Test for one sample,

$H_0$ : Area wise BRTS is insignificant

$H_1$ : Area wise BRTS is significant

#### Statistics

code		
N	Valid	221
	Missing	0
Median		7.0000

Therefore, Median is 7.

T+=	15526
T-=	5264

tcal=	$\min(T+, T-) = T-$	5264
ttab=	TINV(0.025,213)	2.257358

Tcal	>	ttab
5264	>	2.257358

Hence we can conclude that, We do not reject the  $H_0$  at 5% level of significance, so we can say that Area wise BRTS is insignificant.

1. Gender Comparison :-

$H_0$ : The Data is normal.

$H_1$ : The Data is not normal.

### Tests of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
VAR00002	.403	221	.000	.615	221	.000

a. Lilliefors Significance Correction

P-value is  $0.000 < 0.05 (\alpha)$ , So we can say that we reject the H<sub>0</sub> at 5% level of significance. So the data is not normal.

Hence the data is not normal, we applying Non-parametric Test.

Here we want to test male and female are random or not so we apply run Test

H<sub>0</sub>: Male and female are random.

H<sub>1</sub>: male and female are not random.

### Runs Test 2

	<b>VAR00002</b>
<b>Test Value<sup>3</sup></b>	<b>1.3801</b>
<b>Cases &lt; Test Value</b>	<b>137</b>
<b>Cases &gt;= Test Value</b>	<b>84</b>
<b>Total Cases</b>	<b>221</b>
<b>Number of Runs</b>	<b>84</b>
<b>Z</b>	<b>-3.026</b>
<b>Asymp. Sig. (2-tailed)</b>	<b>.002</b>

Here  $Z_{cal} = 3.026 > Z_{tab} = 1.96$ , Hence we can conclude that, We reject the H<sub>0</sub> at 5% level of significance, so we can say that male and female are not random.

1. To Test the expense about BRTS:-

H<sub>0</sub>: The Data is normal.

H<sub>1</sub>: The Data is not normal.

### Tests of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
VAR00002	.483	221	.000	.508	221	.000

a. Lilliefors Significance Correction

P-value is  $0.000 < 0.05 (\alpha)$ , So we can say that we reject the H<sub>0</sub> at 5% level of significance. So the data is not normal.

Hence the data is not normal, we applying Non-parametric Test.

Here we apply Wilcoxon sign rank Test for one sample,

Ho: BRTS is not expensive.

H1: BRTS is expensive.

**Statistics**

VAR00002		
N	Valid	221
	Missing	0
Median		1.0000

Therefore, Median is 1.

T+=	49
T-=	0

tcal=	min(T+,T-)=T-	0
ttab=	TINV(0.025,48)	2.010635

Tcal	<	ttab
0	<	2.010635

Hence we can conclude that, We reject the Ho at 5% level of significance, so we can say that BRTS is expensive.

**Suggestions:**

1. BRTS systems not to be treated as an exclusive system. Need to integrate existing systems with the new systems in terms of physical access, ticketing and governance mechanisms.
2. Adapting BRTS in different ways in Indian cities, rather than one defined prototype.
3. BRTS should be integrated with other means of public transport for better capacity carriage and to cut down the use of personal vehicles.
4. Lower and middle income groups are the most dedicated and captive bus commuters in big cities. Is it possible for BRT to make it more accessible to these groups by cutting down the ticket cost? The cost of BRTS tickets can exclude people and discourage the use of it.
5. Designing emphasis on pedestrian access to BRT stations.
6. Constant review of public should be taken to make improvement in the system if any.
7. BRTS must be effective in lessening the number of urban private vehicles. Commuters should rely on BRTS as the best solution for public pooling relieving burden on urban

road networks especially in peak congestion hours. All necessary actions for making BRTS punctual, efficient, comfortable, commuter friendly and hassle free careful planning and running should be done by local authorities.

8. Given the rise in the usage of the BRTS, it is inevitable that there is a need for increasing the number of buses and thereby reducing the waiting period between two buses on the same route.
9. In the adajan network- running from Pal RTO to Kawas area, the buses are overcrowded during the intervals of 8-11 am and 6-8 pm. The major consumers are the daily workers as well as students.
10. Also there is a need for interconnecting the independent routes such as connecting Adajan route with the one in the Vesu.

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