Performance Evaluation of Rajkot Mass Transport Service

Ms. Nilam Mansuriya[1] Mr. Praful Shinkar[2]
[1]Student [2]Assistant Professor
[1,2]Department of Civil Engineering
[1,2]Atmiya Institute of Technology and Science- Rajkot

Abstract— Urbanization is the most important features of modern civilization. Due to increasing the population, the demand of transportation is also increasing from the last few decades. In the last few years, sustainability has attained a popular place in the transportation planning. It means that 'development that meets the needs of present without compromising the ability of future needs.' Sustainable transport system allows accessibility, mobility and development needs of individuals, society to be meeting safely and in a manner consistent with ecosystem health and encourage the equity between successive generations. For the sustainable growth of transportation, problems or performance of system is studied to using the questionnaire survey with random sample for measuring the commuter's responses towards the transportation system.
Key words: Sustainability, affecting parameters, performance evaluation

I. INTRODUCTION

Transportation which deals with movement of goods and people from one place to another place, has contributed a lot of advancement of civilization, technical progress and development of country. Urbanization is the most important features of modern civilization. With the growth of cities, need for residential building, land acquisition and demand of transport facility are highly increased with day by day. Whatever be the stage in the evaluation of a city, unplanned growth can lead to congestion problem in city center. The approach should be covering all the aspect of urban area, public transport, mass transit, traffic management, pedestrian facility, parking facility.

In the recent past years, the word "sustainability" has attained vary popular place in transportation area. It can be broadly defined as "meets the needs of present without compromising the ability of future generations to meet their own needs". Sustainable transportation can be defined as:"The capacity to support the mobility needs of people , freight and information in a manner that is the least damageable to the environment" The concept of sustainability of which leading some core principles for achieving the goals that is development, efficiency, equity, safety and harmony. A number of international organizations have been involved in development of parameters aiming to achieve a more sustainable transportation system at global, local and regional level.

II. LITERATURE REVIEW

A. Dr. Jean-Paul Rodrigue,(2015),"Transport Sustainability"

Dr. Jean-Paul Rodrigue carried out the concept of sustainability in transportation system. He discussed about the previous scenario of transportation .Sustainable development has been advocated as a priority for future social and economic development. He also focused on definition of sustainability which has been expanded to include three major principles referred as the 3Es. Briefly discussed about 3Es Equity, Economic Efficiency and Environmental responsibility. It promote the public transportation .It also recommended for non motorized transport mode like cycling, walking.

B. BhariraviDhakras,(2004)," Study of parameters in the development of sustainable transportation system :a case study of Mumbai, India

This paper is carried out information about parameters related to transportation. She explained the details about sustainable transportation system and sustainable development. The aim of this paper is to identifying transportation problems in the Mumbai city, and studying their causes, measuring and suggesting feasible measures for sustainability. Various parameters related to transportation are evaluated which affect the sustainability point of view. She collected data of transportation system by using Online Survey. Through this survey it is able to collect views and opinion of people or commuters behavior. In this questionnaire survey, a question seeking information about the overall performance of city transportation was asked and parameters were mentioned and respondents were to rate the satisfaction level.

C. Diem-Trinth Le-Klahn(2012),"Measuring Tourists' Satisfaction with Public Transport in Munich,Germany"

This study discuss the use of public transport by tourists in the city of Munich, Germany. It finds to understand the behavior of passengers and which parameters influence level of satisfaction. For the study of tourists use of public transport, data collection was carried out using questionnaire based survey. After that the analysis of data was carried out using two steps. First is Tourists'level of satisfaction and second is principle component analysis with Varimax orthogonal rotation method. Factor analysis was also carried out and it resulted into 4 different factors services namely comfort, services, accessibility and other.

D. Muhammad Asharf Javid, Toshiyuki Okamura, Fumihiko Nakamura and Rui Wang(2013), "Comparison of Commuters' Satisfaction and Preferences with Public Transport: A Case Study in Lahore"

The aim of this study is to compare the different modes' users for satisfaction level and preference with public transportation. Data was collected using questionnaire survey and structural model was developed for satisfaction with system and preferences to use public transport. Distribution of different mode users' satisfaction with wagon service quality was analyzed. Structural model shows the relationship of commuters with improvement of symbolic and functional factors of wagon service. Its very helpful in improving the quality service of wagon.

III. RESEARCH METHODOLOGY

To examine the commuter's behavior and satisfaction with public transport, the data were collected from a Questionnaire survey. It is a standard in research on customer behavior. Data were analyzed in two steps using statistical method using SPSS software.

A questionnaire was consisting the following information: (1) personal details, trip details,(2) level of satisfaction with service quality of system service. The questionnaire was designed to know preference of all mode users .And in the last of questionnaire the rating of parameters is very important with level of satisfaction of commuters. It is evaluating using Likert scale; i.e., Strongly disagree, somewhat disagree, somewhat agree and strongly agree. The following table shows the attributes of service quality of public transport.

IV. DATA COLLECTION

Rajkot city is very fast growing city of Gujarat and especially in Saurashtra Region. So the development of road network and facility of transportation in Rajkot city is also very fast. There is also increase in vehicle ownership and population in the city in last decade. The vehicle growth of Rajkot city is shown in table and graphically in Fig. Total vehicles in Rajkot city is continuously increasing. It is shockingly fact that in last two year vehicle growth is decreasing in the city. Almost two wheeler and four wheeler having a greater composition in the share of total vehicle. Following Figure represent the vehicular growth of Rajkot

A Rajkot city is divided in mainly 3 zones i.e. West zone, Central zone, East zone. These 3 zone are also divided into 18 wards of RMC. This study area has been selected on the basis of main parameter of transportation which population and traffic condition of that particular area. In this selected area has been suffering from the various transportation problems which is most affected to the sustainable development of transportation system.

Fig. 1:

The study area is Trikon Bag to Kalawad road and main junctions of selected stretch are Trikon bag, Astron Chock, Swaminarayan Temple, Kotecha Circle , KKV hall. For the evaluation of parameters which are affecting to the sustainable growth of Rajkot Mass Transit System, the questionnaire survey was carried out at different location of selected stretch.

The survey was done in January 2017.And other pilot surveys was also carried out before the questionnaire

survey for determination of traffic volume, delay of vehicles, occupancy of RMTS etc. The format of questionnaire survey is shown in Appendix-A. Data was collected from different modes' users and also from passengers of RMTS using random sampling.

Parameters	Very bad(%)	Bad(%)	Average(%)	Good(%)	Very good(%)
Route coverage	29.2	9.4	24.8	20.4	16.2
Punctuality	29.2	16.	21.5	22.4	10
Reliability	4.7	14	21.5	42.8	18
Availability of mode	5	13.3	17.4	45.7	18.6
Waiting time at stop	8.3	17.1	22.4	34.5	17.7
Boarding / Alighting facility	5	10.9	25.1	43.7	15.3
Delay	13.6	33.3	13.9	25.4	11.8
Cost of travel	4.7	7.4	17.7	40.1	30.1
Safety, security on public transport	11.2	23.9	15.3	29.8	19.8
Access to transit	4.1	6.2	20.1	39.8	29.8
Real time Information	4.4	13.6	15	37.5	29.5
Seat availability	6.8	13.9	21.5	41.3	16.5
Physical condition	6.8	12.4	24.5	42.2	14.2
Service frequency	6.2	21.2	24.5	30.1	18.0
Staff service	2.4	8.6	21.8	49.3	18.0

Table 1: Percentage Rating of Parameters for the Acceptability of Rajkot Mass Transport Service

V. DATA ANALYSIS

The analysis of questionnaire survey showed that the how much percentage of people were using public transport and were not using. Also identify the problems of commuters, why they were not using the public transport because of less convenient travel, more incurred travel time, less frequency between the successive trips and lack of accessibility in the modes of public transport.

SPSS 20.,a statistical analysis tool was used to carry out the statistical analysis. Two statistical methods have been used for the analysis of the survey responses. A data reduction technique called as Factor Analysis was used

to group these variables into fewer numbers of group. This method was mostly used to reduced a large number of overlapping variables to a much smaller set of factors. This factor loading indicate the correlation of independent variables.

Sr. No.	Parameters	Sr. No.	Parameters
1	Route coverage	9	Safety, security on public transport
2	Punctuality	10	Access to transit
3	Reliability	11	Real time Information
4	Availability of mode	12	Seat availability
5	Waiting time at stop	13	Physical condition
6	Boarding / Alighting facility	14	Service frequency
7	Delay	15	Staff service
8	Cost of travel		

Table 2: Attributes of Service Quality of Public Transport

A detailed statistical analysis is carried out in order to see how the parameters considered as independent variable affects the acceptability of the performance of city transportation systems. The acceptability of performance of the transportation system in city depend on people's views. The output of these statistical methods is then interpreted in order to access the quality of the variability of the user's perceived satisfaction with respect to the public transport system. In order to measure the degree of satisfaction among commuters during their regular travel, concept of Commuter Satisfaction Index (CSI) is used. Sustainable transportation demands maximum convenience of commuters with minimum cost and least adverse effect on the environment and resources. Commuter satisfaction and convenience are the measures for determining sustainability from social aspect.

	Average Score	Importance Score	Weighting factor	Commuter Satisfaction Index
Route Coverage	2.9249	5	0.067	0.19
Punctuality	2.7909	5	0.067	0.18
Reliability	4.0027	5	0.067	0.27
Availability of mode	3.6247	5	0.067	0.24
waiting time at stop	2.0777	5	0.067	0.14
Boarding / Alighting	3.5871	5	0.067	0.24
Delay	1.9169	5	0.067	0.19
Cost	3.8713	5	0.067	0.26
Safety ,Security on public	4.1340	5	0.067	0.28
Access to transit	3.8633	5	0.067	0.26
Real time Information	2.4477	5	0.067	0.16
seat availability	2.9920	5	0.067	0.20
Physical Condition	3.4960	5	0.067	0.23
Service Frequency	2.6381	5	0.067	0.18
Staff service	3.7480	5	0.067	0.25
Total		75	0.067	**3.22**

Table 3: Commuter Satisfaction Index Calculation

VI. CONCLUSION

This study was conducted to evaluate commuters' satisfaction and preference with public transportation and make comparison between different modes of transportation. To Estimate the bus passenger demand have been important to service providers and bus operators. Forecasting public transport demand by conventional methods requires massive data and long time. So there is a need of such kind of model in general or city specific based on most effective parameters on which transit demand depends.

Present study is a part of a research study to development of a model for sustainable growth of public transportation system in city. Survey respondents were asked to rate the each parameters according to how they would rank the public transport service in question with respect to that parameters. The data were used as a input for the factor analysis. The output of factor analysis was used to create variable reflecting the four factors. The obtained factor were used as a explanatory variables in ordered probit models explaining the respondents satisfaction as a dependent variable. All models have been estimated using the R framework for statistical computing.

Several actions should be taken at local level in order to address the above problem and to highlight the necessity for sustainable salutation. This study will also help in explaining the important parameters that need to be considered in developing public transportation facilities.

REFERENCES

[1] Diem-Trinh Le-Klahn, "Measuring Tourists's Satisfaction with Public Transport in Munich, Germany", 2012, Germany.

[2] Mumhammad Ashraf javid et.al.,"Comparison of Commuters,Satisfaction and preferences with Public Transport: A case of Wagon Service in Lahore",Jordan Journal of Civil Engineering,Volume7,No. 4, 2013.

[3] Ar Anuj JAiswal, Dr. Ashutosh Sharma,"Optimization of Public Transport Demand :A Case Study of Bhopal",International Journal of Scienfic and Research Publication,Volume2,july 2012.

[4] Dr. Rodrigue J.P.,(2013) "transport and sustainability",The Geography Of Transport System,Third Edition(2013),PP 1-4.