TRIP MAKING BEHAVIOUR IN THE MODASA TOWN (Gujarat)

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Abstract— For a small town transportation planning involves travel demand modeling in which trip generation plays a effective role. A travel demand model that considers socioeconomic factors based on anticipated land use, household and employment changes. A survey estimates the trip generations and choice of transport modes in the given study area. The travel demand quantify by conducting Home Interview Survey in the given study area. From this survey how many trips made in the study area in terms of trip purpose, mode of travel, travel time can be quantify. These data helps to statistical models development by considering population, employment, socioeconomic characteristics. The travel characteristics are estimated from the travel demand model For the present population and employment.

Keywords— Home Interview , Trip Generation.

I. INTRODUCTION

An educational and medical hub modasa town is very famous and this two basic need of people attracts public to live in the town. The Travel demand for transportation in the town is linked to the residential location choices that people make in relation to places to work, shopping, entertainment, schools and other important activities. Demand for transportation is dependent on town growth. Increasing urbanization, population growth and rising incomes are the primary causes of rapid growth of travel demand in any Indian cities. Travel demand occur as a result of thousands of individual travelers making individual decisions on how, where and when to travel. Such decisions are affected by many factors such as family situations, characteristics of person and choice (mode, route and destination) for the trip. The trip generation, trip distribution and modal split and route assignment will provide the necessary tools for planning, choice of alternate planning and project implement. This plan provides an analysis for the user behavior (travel demand) in the given study area. This survey and analysis provides a modifiable approach for analyzing travel demand in the given study area.

REVIEW OF LITERATURE

A town having 1,25,000 (according to municipality data) population. To find future travel demand Travel demand forecasting is the process of transportation model. To study the present scenario of travel trends the trip generation analysis is necessary as a primary stage of planning process. Town planners in developing Public transport systems get help from Trip generation data which analyze in the study area. From home interview survey an idea can create to tackled traffic situation prevalent in the given study area thereby suitable steps may be taken to improve the traffic behavior of a study area. The scope of the study is to determine the reliability of currently accepted traffic forecasting methods of trips generated on the basis of various socioeconomic data which will help the planners to satisfy need for the travel behavior and needs of the people to improve the overall transport connectivity in the affected study area.

Following objectives are considered from the study:

-To study the current travel trends in the study area
- To develop statistical models for the trips produced in various purposes
-To study the choice of mode selection in the households of the study area.
-To understand how demographic changes in the study area will affect the travel Demand.

METHODOLOGY

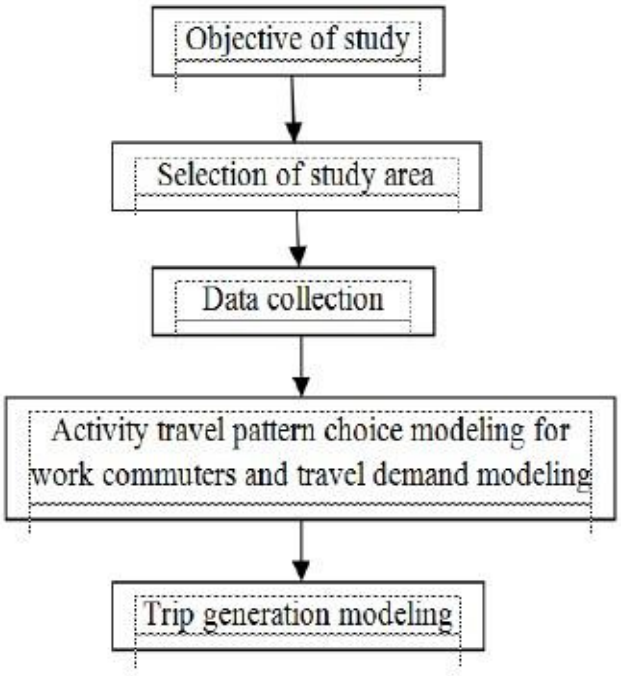

Fig. 1: Methodology flow chart

TRAVEL DEMAND MODELLING

Rate methods with linear regression equations (1) are the most frequently used methods to evaluate the number of generated trips based on historical data. Transport generated trips are expressed as the number of trips per unit X, where X – the factor that describes the activity of land use, for example, for retail – the gross leasable area, for residential buildings – the number of apartments.

As per home interview survey data linear regration is carryout in an Axel using linest function in all considered zones x1= Household size , X2=Worker, X3= Vehicle ownership , Y= Daily trips.are found dominant factors for trip generation. The equation are shown below.

Linear regression equations evaluate the number of generated trips that attract research area (dependent variable) from independent variables

$Y= A+ B_1X_1+ B_2X_2+\ldots\ldots+ B_nX_n$ .....(1)

Zone-2 (Gandhi vada)

$Y= 2.8499+ 1.49X_1+ 0.574X_2+0.902X3$ .....(2)

$R_2 = 0.691$

Zone – 3 (Megharaj Road)

$Y= 1.531+ 2.09X_1+ 1.34X_2+4.32X3$ .....(3)

$R_2 = 0.478$

Zone – 4 (Malpur Road)

$Y= 0.875+ 1.163X_1+ 0.428X_2+2.39x3$ .....(4)

$R_2 = 0.567$

From this equation obtain maximum R_2=0.691.

X1=Household size
X2=No. of Workers
X3= Vehicle ownership
Y= Daily trips

Where Y – the dependent variable (trips/household), x1, x2... – independent variables (population, number of apartments,gross leasable area), b1, b2..bn – regression coefficients that show to what extent Y changes, if n variable increases. The current paper considers various information systems for trip generation calculation based on regression equations and/or average rates.

STUDY AREA

Fig. 2: Study area

Fig. 3: Study area of Modasa (Zone 2, 3 &4)

Modasa town in gujarat has 12 wards. The ward wise updated land use maps of Modasa town was developed by using Remote Sensing and GIS techniques with the help of high resolution satellite image maps. In this study, the google image (21st JANUARY 2015) were used to generate the ward wise land use map. The different land use themes were identified by suitable visual interpretation and image classification procedure. Ground truth survey is also done to improve the accuracy of the land use classification.

TRAVEL BEHAVIOUR STUDY

Home Interview Survey is the one of the most reliable type of surveys for collection of origin and destination data. The survey is essentially intended to yield data on the travel pattern of the residents of the household and the general characteristics of the household influencing trip-making. It is impractical and unnecessary to interview all the residents of the study area. The sample size for the Home Interview Survey is taken as 15% of the total number of residents in the study area.

TRIP PURPOSE DISTRIBUTION

The data showed 42% work based trips followed by 19% school trips, 12% collage trips, 27% recreational trips were produced in the study area as shown in figure.

Fig. 4: Trip Purpose Distribution Chart

TRAVEL MODE DISTRIBUTION

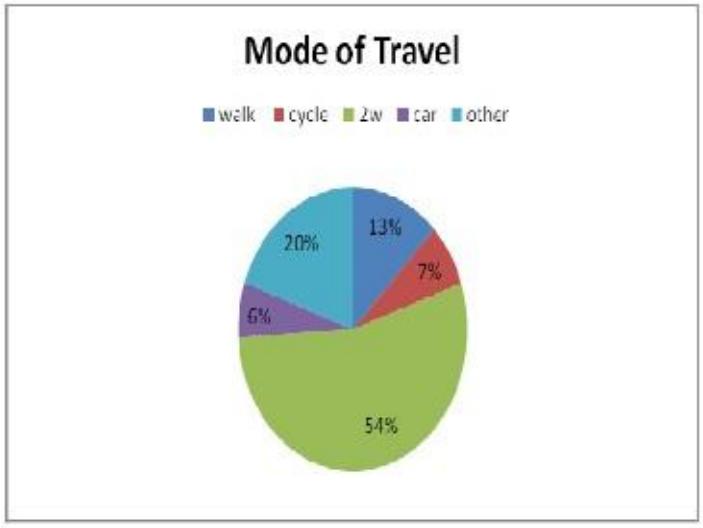

Fig. 5: Travel mode distribution

54% people preferred two-wheeler as the mode of travel followed by 13% giving preference to walk, 07% bicycle, 06% four-wheeler as Shown in figure.

GENDER CLASSIFICATION

The distribution of employees by gender is shown in the figure. It is observed that 78% of them are male and 22% of them are female are working in the commercial areas considered.

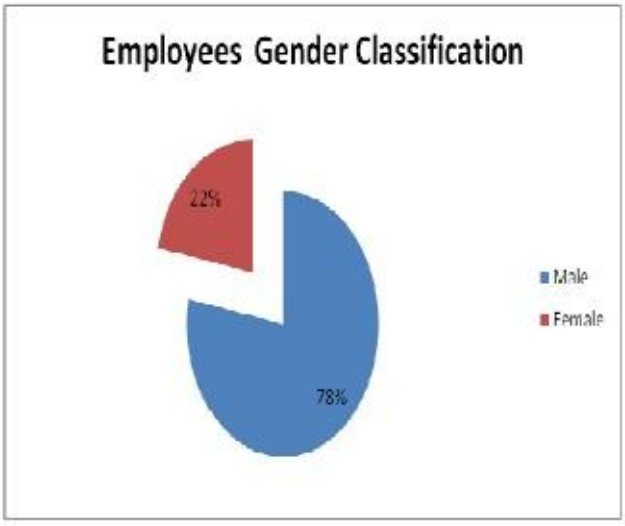

Fig. 6: Gender classification

MODES OF TRAVEL

During morning peak hour, for most of the trips two-wheelers were preferred followed by bus while walking was preferred for most of the evening travel trips.

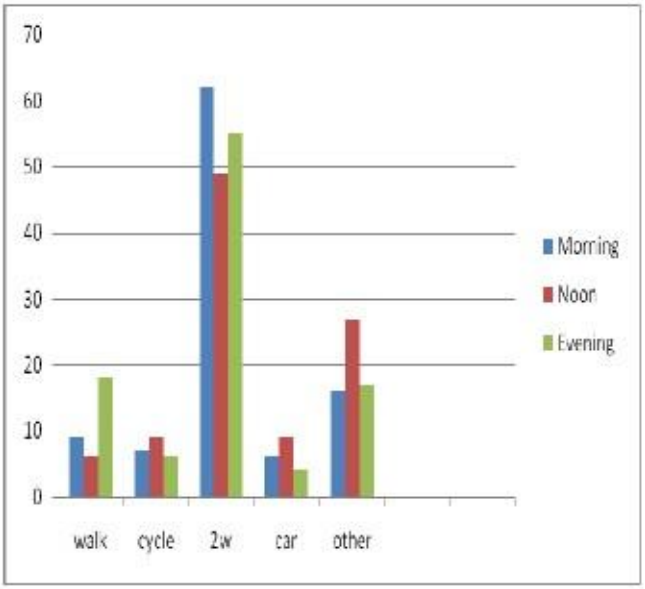

Fig. 7: Travel mode during day session

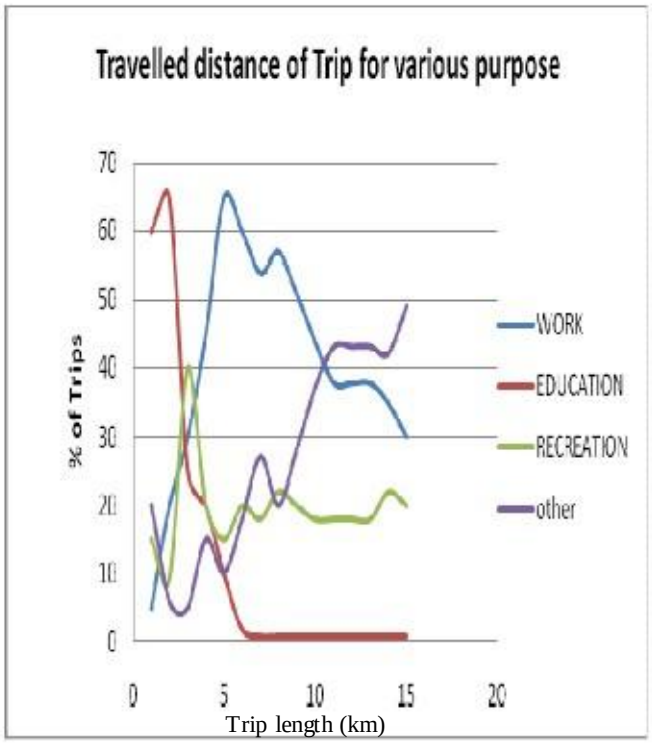

Fig. 8: Travelled distance of trip for various purpose

TABLE:1

Category analysis for H. H. Size Vs vehicale ownership

H. H. SIZE	VEHICALE OWNERSHIP				
	0	1234 OR MORE			
1-2	2.0	4.0	3.25	5.5	0.0
3-5	12.0	8.6	9.03	10.4	12.4
6-8	0.0	0.0	6.0	19	25
9-11	0.0	0.0	0.0	0.0	20

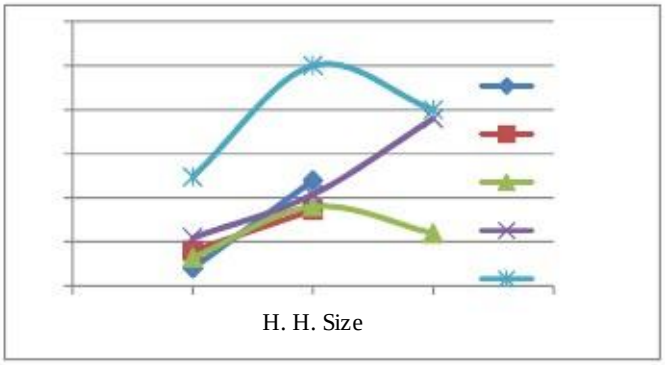

Fig. 9: Vehicle ownership vs H. H. Size relationship (X axis: H. H. Size, Y axis: Average trips per day)

CONCLUSION

At Modasa town total samples collected from the Household interviews were 900.from the home interview survey can be as concluded below:

1) The average household size was found to be 4, with a maximum household size of 11 and a minimum household size of 1.

2) Monthly income data for residential areas showed that 18% people were having a monthly income of Rs5000 - Rs10000.A total of 61% people in residential areas were found to have a monthly income between Rs10000 -Rs20000 and 21% people in residential areas were found to have a monthly income more than Rs20000.

3) Two wheelers stood out as the most preferred mode of travel with 55%, 10% walking, 8% cycle and 7% car trip, while 20% people opted for public transport systems in residential and commercial areas.

4) About 49% of the total trips generated were within 4 km – 8 km in localities.

5) The survey data showed that 42% trips in residential areas are work based and are limited to a distance of 4km – 8km. College based trips accounted for 12% of the trips ranging in a distance from 0km – 6km, whereas about 19% were school based trips within 0km – 8km.

6) The statistical models so developed on the basis of these travel patterns in residential areas showed a total of 42% work based trips followed by 31% educational trips per day. 27% recreational trips were found to be generated in the study area per day.

7) The preferred mode by the individuals for the work trips were found to be 51% for two-wheelers followed by 26 % Public bus and for the educational trips 34 % for School or college bus and followed by 20% for public buses.

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