Analysis of Mode Choice Behaviour of Students for College Trip

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Abstract— **this paper explores the mode choice decision for single day student trips. The mode chosen for a trip is influenced by both quantitative and qualitative model of the students as well as of the mode. Data pertaining to the personal and trip characteristics of the travellers was collected at vadodara to waghodia route. The variables like, age, household income, group size and house hold size on choice of travel mode was studied using cross classification analysis. The study explores the economics of carpooling with respect to the nature of participation. Objective of the study is focus on trip behaviour of students by data acquisition.**

Keywords: - **Age, Household income, Group size, Travel time, Waiting time, Cost, Mode selection, Distance between home to collage.**

I. INTRODUCTION

India is one of the fastest growing developing countries in economy and population. India's urban population is around 30 % of the total population which will increase up to 60 % due to rapid urbanization. In 2001, urban population of India is 285 million which would grow to about 473 million in 2021 and 820 million in 2051 (National urban renewal mission). Hence, cities in order to support the required level of economic activity must not only meet the mobility requirements of the present but also provide for the needs of those yet to join the urban population by providing an easy and sustainable flow of goods as well as people. Sustainable transport development plans are now replacing the routine approach of building more roads to alleviate congestion with an integrated transport system which is affordable, space and resource efficient, and minimizes environmental impacts. As a consequence, rapid transit options; such as City Bus Services like VTcos, Mass rapid transport system like BRTS, Metro or Monorail have evolved as much affordable and sustainable mobility option. They are regarded as sustainable, environmental friendly transport mode and are being implemented in many cities of the world. The mode choice behaviour of the students was analysed for "TO COLLEGE" trips only. The study was determined the significant attributes of the trip maker that affects mode choice. The attributes are classified as the ***socio-economic characteristics*** *and* ***trip characteristics****.*

II. OBJECTIVE OF STUDY

The study is specifically interested in the relationship between different modes, it concentrated on usage for different modes in the college period.

III. FACTOR INFLUENCE OF MODE CHOICE

The factors affecting a person's choice of mode are numerous and it would be difficult to incorporate all of them in the transport model. Broadly these factors may be classified into three groups:

Traveler Characteristics: The following features are generally believed to be important:

- Car availability and/or Ownership; Possession of a driving-license;
- Household structure (young couple, couples with children, retired, singles, etc); Income; Decisions made elsewhere for example the need to use car at work, take children to school; Residential density.

Trip Characteristics: Mode choice is strongly influenced by:

- The trip purpose for example journey to work is normally easier to undertake by public transport compared to other journeys because of its regularity;
- Time of the day when the journey is undertaken late trips are more difficult to accommodate by public transport.

Service Characteristics: These can be divided into two categories:

- Firstly, quantitative factors such as: Relative travel time, in-vehicle travel time, waiting and walking times by each mode; Relative monetary costs (fares, fuel and direct costs); Availability of public transport and cost of parking;

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- Secondly, qualitative factors which are less easy to measure, such as: Comfort and convenience; reliability, convenience, safety etc.

IV. STUDY AREA

Vadodara, formerly known as Baroda, is the third largest and most populated city in the Indian State of Gujarat, after Ahmedabad and Surat. Vadodara is one of four cities in the state with a population of over 1 million.

Road Transport:

Public transport vehicles within the city include buses, auto rickshaws and Chhagadas. Now there are buses owned by VTCOS for an easy public transportation operated by the private bus operators VTPL which now runs over a hundred buses of 33 and 50 seated configurations. It has taken a lot of two wheeler traffic off the road and helped the people in easy safe and cheap transport service. A significant proportion of the population uses their own vehicles – cars, scooters, motorcycles and bicycles. Following data of road lengths are given for Vadodara district.

Paved Roads: 1680 km
Unpaved Roads: 400 km
Total Roads: 2080 km.

Demographics:

As of 2011 India census, Vadodara metropolitan area had a population of 1,666,703. Males constitute 52% of the population and females 48%. Vadodara has an average literacy rate of 92.37%, higher than the national average of 59.5%; male literacy is 82%, and female literacy is 74%. In Vadodara, 9.3% of the population is under 6 years of age. The Projected population of Vadodara city in 2031 is around 4 million (RITES).

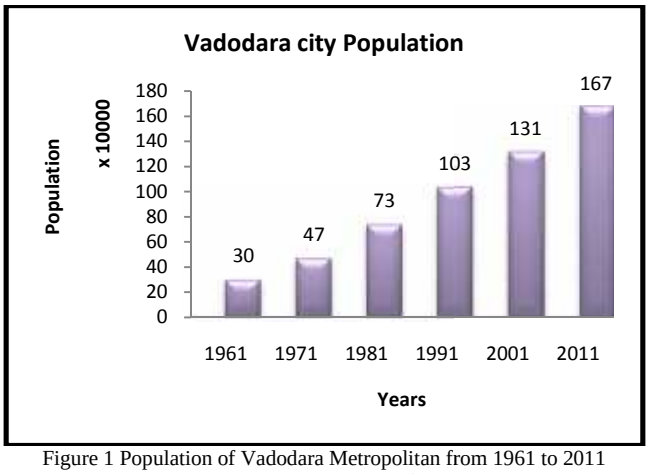

Figure 1 Population of Vadodara Metropolitan from 1961 to 2011
(Source: Google: Census of India)

Mode share:

The City of Vadodara has recorded 1.22 lakh of Vehicle registered in a year of 2011 of all type. The below chart was showed the mode share of vadodara city in a year of 2006, represented by RITES. The Private vehicles recorded maximum percentage of 36 of 2 wheeler and 5 of cars against the bus (5 %) which is very less compare to private vehicles. The auto rickshaws have been used at 14 %.

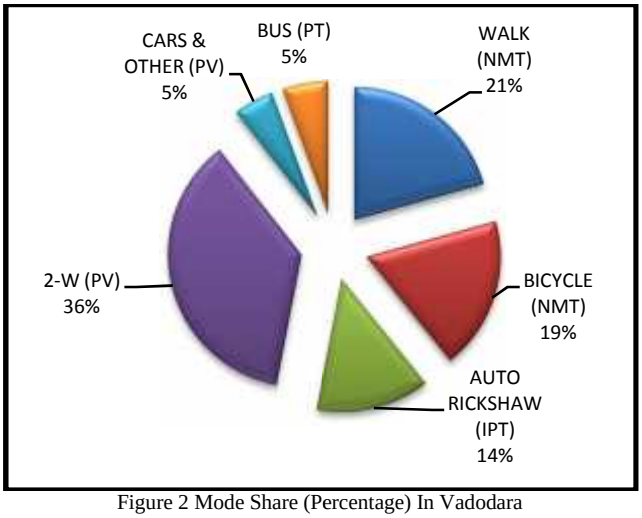

Figure 2 Mode Share (Percentage) In Vadodara
(Source: RITES, 2006)

Figure 3 Study area

ORIGIN PLACE	IMPORTANT LOCATION	TRIP LENGTH IN KM
Waghodiya chowkdi	Khatamba	7
	Gayatri Temple	3
	BSNL office	5
	Amodar	6
	Suzlon	9
	Dental college	10
	Parul Institute	12
	Apollo tyre	12.5
	Waghodiya CIDC	14
	Waghodiya Village	16

Table 1 Distance between the source station to the important location in study area for the road width of 18MTS

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V. DATA COLLECTION

In order to determine the perceptions and preferences of commuters towards the existing travel pattern in Vadodra, the survey method was selected, experimental design of survey format was setup and field survey was conducted. The methods taken and the data required were all identified in this stage through literature survey and also the potential sources of data and survey representation was identified.

To achieve the objectives of this study, survey was required to be carried out in different colleges of waghodia road.

Various data required for the analysis at various stages of this research are:

» Personal Information: Location of the household, age, income, vehicle availability, household size, occupation/ status;

» Travel Characteristics: Total travel time, transport mode, travel cost, walking time, and waiting time, travel distance,

» Mode Characteristics: Comfort, safety, Regularity, economy, door to door services,

» Mode shift data: Willingness to shift to existing mode of transport from their private mode of transportation on the basis of various attributes;

» Model Estimation based on the Socio-Economic differences of the Samples;

Methods which can be employed in collection of the requisite data can be:

» Field survey providing information about the socio-economic character and their travel behavior of a students;

» Individual surveys which can attempt to relate the socio-economic background of students with his/her travel behavior are being made;

The Reveal preference survey, which can be help to know about the choice-making behavior of an individual

In the field work, data collection has been collected from various data source. The stratified random sampling method selected for the data collection. The strata selected for sampling are students of institute like sumandeep and parul.

VI. RESULTS AND DISCUSSION

The data from the survey was analysed statistically to get an insight on how the sampled population varied based on their socio-economic, demographic and travel characteristics.

Socio-economic & Household Characteristics:

Socioeconomic and household characteristics such as sex, age, occupation, household size, household income, vehicle ownerships, play an important role in the travel characteristics.

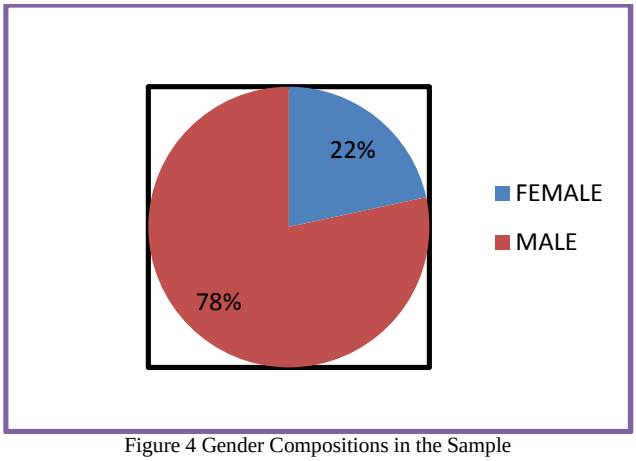

Figure 4 Gender Compositions in the Sample

Out of total responses, 78 % are male they have higher percentage in the target group and on the other hand 22 % are female, due to the fact of Male are the main earner from the household.

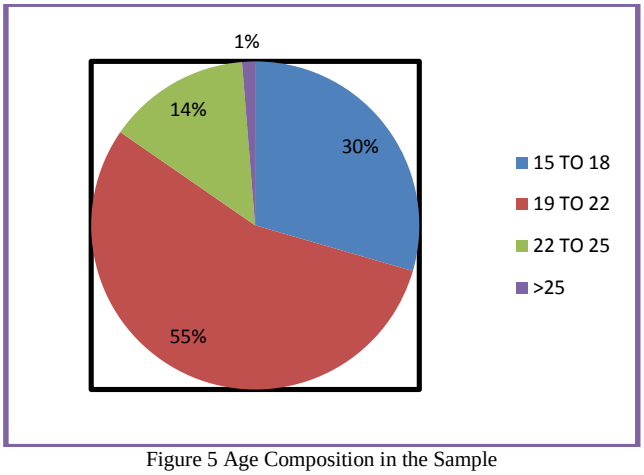

Figure 5 Age Composition in the Sample

In Age group most of the Respondents are belonging from 15 to 18 and 19 to 20 years of Age group (30 % and 55 % respectively).

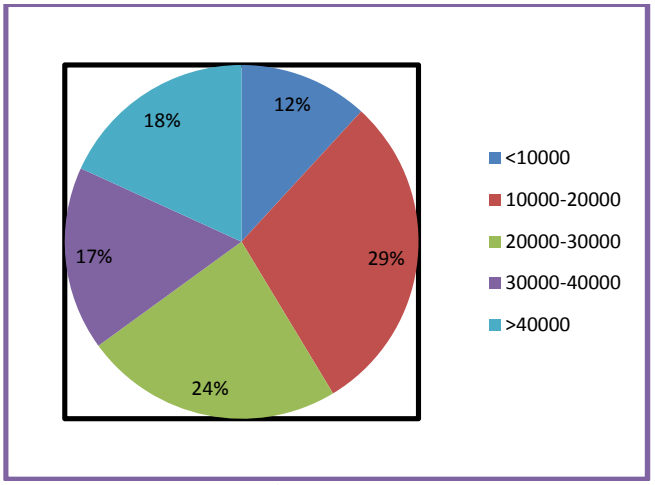

Figure 6 Composition of HH Monthly Income in the sample

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Figure 6 showing the Household Income, which is the most important parameter which decides the Travel mode characteristics of the Respondent. Also it affects the car ownership of household and Average Trip length. The household income also decides the Vehicular composition of the household, as the income increases the car ownership and 2 wheelers ownership increases.

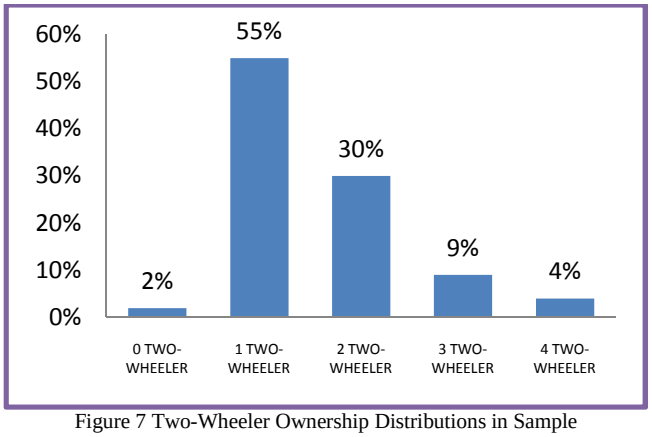

Figure 7 Two-Wheeler Ownership Distributions in Sample

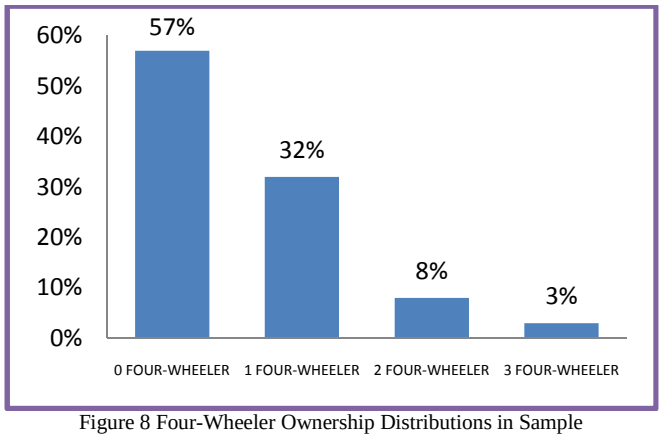

Figure 8 Four-Wheeler Ownership Distributions in Sample

Every household has its own Vehicular composition, which denotes the living of standard of the household. The Vehicular composition and the household income are the interrelated parameters and numbers of car ownership depends on the total income of household.

Travel characteristics in commuting daily trips:

The bus contributes only 4 percent of the total share. This shows that people are more interested towards private mode uses, especially motorcycle and less attracted to use of bus for their daily trips.

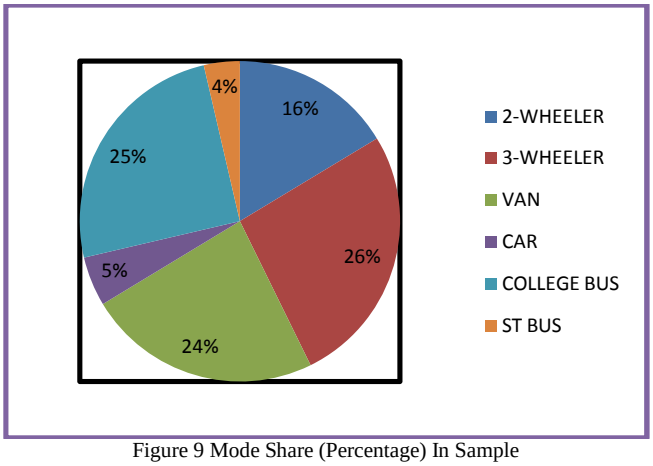

Figure 9 Mode Share (Percentage) In Sample

Reason to select vehicle for present journey:

In the following chart there are five reasons asked by means of survey and they have given different weight age to the reason. So from that weight age in percentage is given in the chart given below.

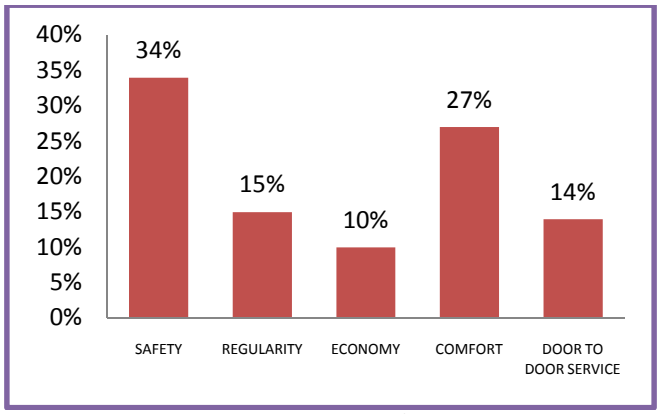

Figure 10 Reason to select vehicle for present journey

VII. CONCLUSION

The major findings of the study are listed below:

1. From the analysis it is concluded that 55% are fall under the 19 to 22 year age category.
2. From the survey analysis it is concluded that 26% of 3-wheeler are utilized and 24% of van are utilized.
3. From the survey it is concluded 24% of college student prefer to safety and 27% are prefer comfort.
4. From the survey it is concluded the frequency of govt. bus are very less on this route thus, govt. have to increase the bus facility.
5. Higher income groups gave more importance to private, which is indicated by higher use of own vehicle.
6. The mode share analysis of students who belongs to lower middle and lower income group of society are

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using private mode for their work trip compare to public transport system.

7. The patronage for private mode of these groups for their work trip is mainly due to the inadequacy of public transport system particularly in terms of frequency and high waiting time at bus stop to destination.
8. The desired improvement in existing public transport system as expected by these groups of student's emphasis on increasing bus frequency and speed of vehicle compare to comfort and frequency.

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