International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 02 | Feb 2021 www.irjet.net p-ISSN: 2395-0072

Impact of Transportation Connectivity: A Case Study of Twin City Planning for Surat – Navsari

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Abstract - *Good transport connections have direct benefits to people, businesses, the environment, and the overall economy. Good transport facilities between two cities can widen people's job-search area and help them find employment. It can also reduce commuting times and reduce the cost of living. Public transport is especially important for lower income groups, where 42 per cent lack access to a car or van (compared to only 8 per cent of those in the highest income group). And high-skilled workers are more likely to travel across longer distances to work, especially if they are following good job opportunities.*

It thus becomes utmost important for cities like Surat and Navsari to have a good transportation connectivity so that both the cities have an equal opportunity to grow. Since Navsari has a good command over agricultural activities and most of the agricultural goods in Surat come from Navsari, and majority of people in Navsari are dependent on Surat for job opportunities, this becomes an important topic to study and bring both the cities near one another.

Key Words: *Twin city Planning, Transportation Connectivity, Surat – Navsari city*

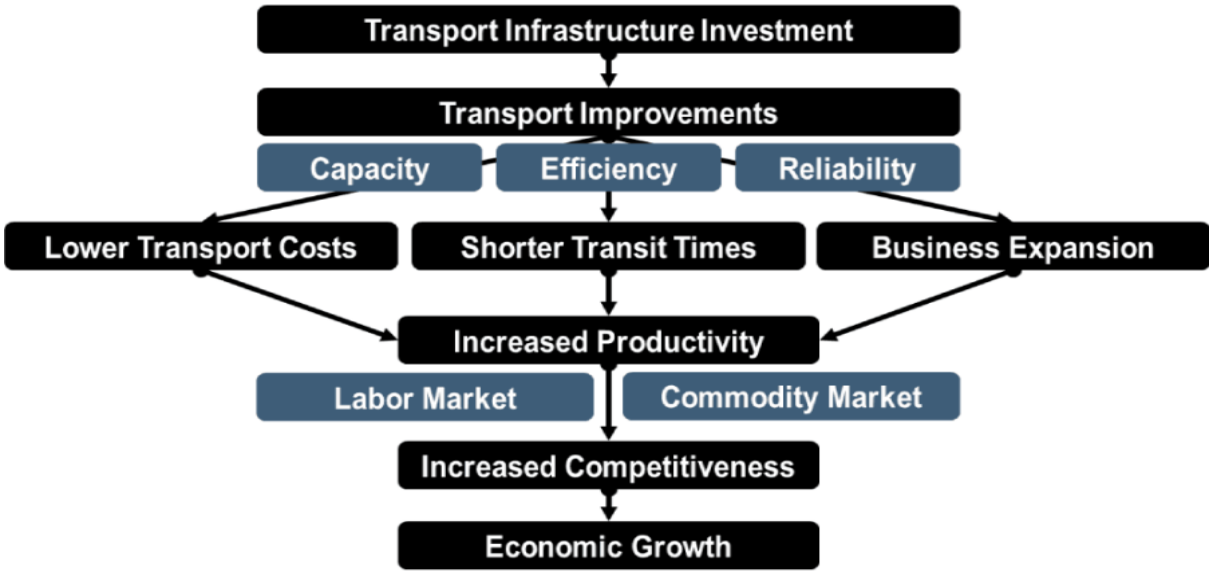


Figure 1 Transportation and economic connection

I. INTRODUCTION

Public transit is more than a means of transportation: it serves as a key component in addressing poverty, unemployment, and equal opportunity goals. For low-income families, automobile ownership is far from universal, access to reliable vehicles is even less commonplace, and continually decentralizing job opportunities along with skyrocketing gas prices have left them more transit-dependent than ever. To help low income individuals get and keep jobs, equitable and efficient transit is a must.

Efficiency of road network can be achieved through proper transportation planning and impact assessment of particular land uses indicates the possibilities of transportation planning. This study aims at finding out the impacts of different types of land uses on transportation system between Surat Navsari cities.

1.1 Benefits of proper transportation:

I. Economic benefits

a. **Expand market**: Markets for both industrial and agricultural produce expand both on the domestic and international front with the expansion of transport network. For example, through the expansion of road, rail and water transport, it got good success making links between different parts of the country and with other countries of the world.

b. Deduction in scarcity: It helps in solving the problem of scarcity of goods and factors in different regions of the country.

c. Reduction in Cost of Production: The transportation network reduces the cost of manufactured goods and lowers the price in the markets.

d. Specialization of Labour and Mobilization of Resources: By the efficient and effective transportation system, the benefits of specialization of labour and proper mobilization can be achieved. Thus, an economic system makes the best use of resources through good transport system.

II. Social Benefits

a. More Employment Opportunities: Transport helps to create employment opportunities and thus, it provides employment through helping mobility of workers. About 18 lakhs people are employed in Indian railways. In the same way, lakhs of people are employed in roadways, shipping and air transport.

b. Social and Cultural Spirit: Means of transport brings together persons living at different corners of the country. They exchange their views. They have the common problems, because of their living together. Consequently social and cultural unity emerges. Thus, developed means of transportation are also responsible for international brotherhood.

c. Higher Standard of Living: Transportation has reduced distance. As a result, we enjoy the position to use various varieties of things produced in different corners of the world. These standard commodities increase our standard living which depends upon goods and services, we consume.

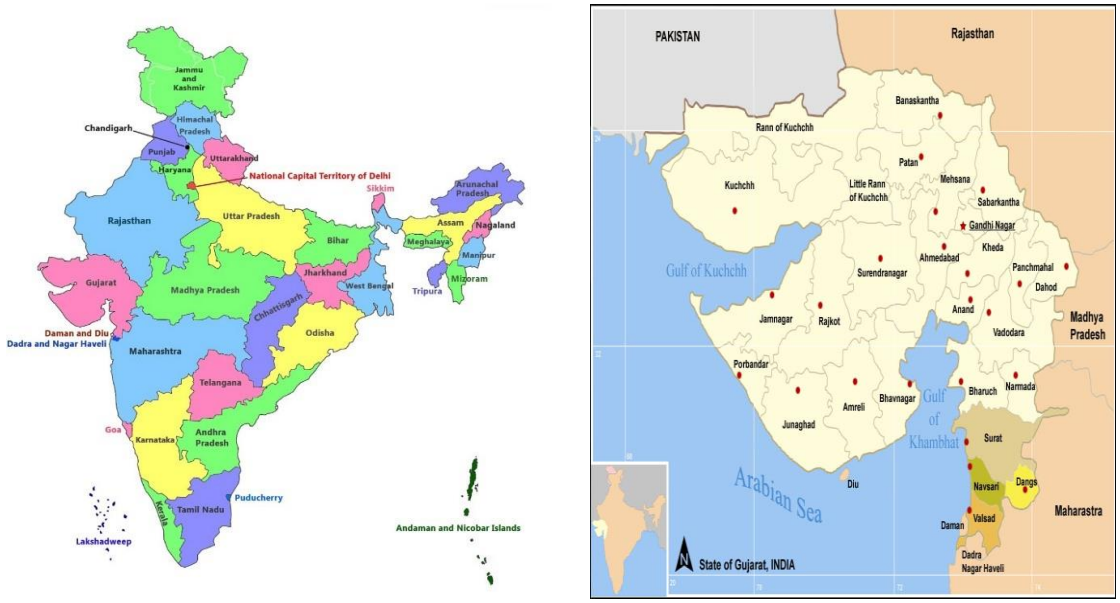
d. Relationship between Villages and Cities: Means of transport has reduced distance between villages and cities. Men and materials move from villages to cities and from cities to villages. Villagers can now avail of the employment opportunities available in cities. Villages, in close contact of cities develop faster.

2. Aim

To prepare a planning proposal for transportation connectivity of Surat-Navsari as a Twin city.

3. Study area

Navsari is a city located in the western part of India in the state of Gujarat state. Navsari is one of the oldest cities in southern Gujarat. it's linked by Ahmadabad – Mumbai broad-gauge railway line and therefore the national highway no. 8 which passes nearly from the town. Navsari is situated between 20◦ 55' North latitude and 72◦ 55' east longitude. Mumbai is about 260 km to the south and therefore the city of Surat is about 30 km to the North of the town. The Arabian Sea is around 7 km toward the west, where the Purna River makes delta, which is west of the town and exhausts into the Gulf of Khambhat. Navsari is likewise the dual City of Surat and just 30 km south of Surat. In 2016, Navsari positioned because the sixteenth greatest city of Gujarat province of India by the people in 2011.



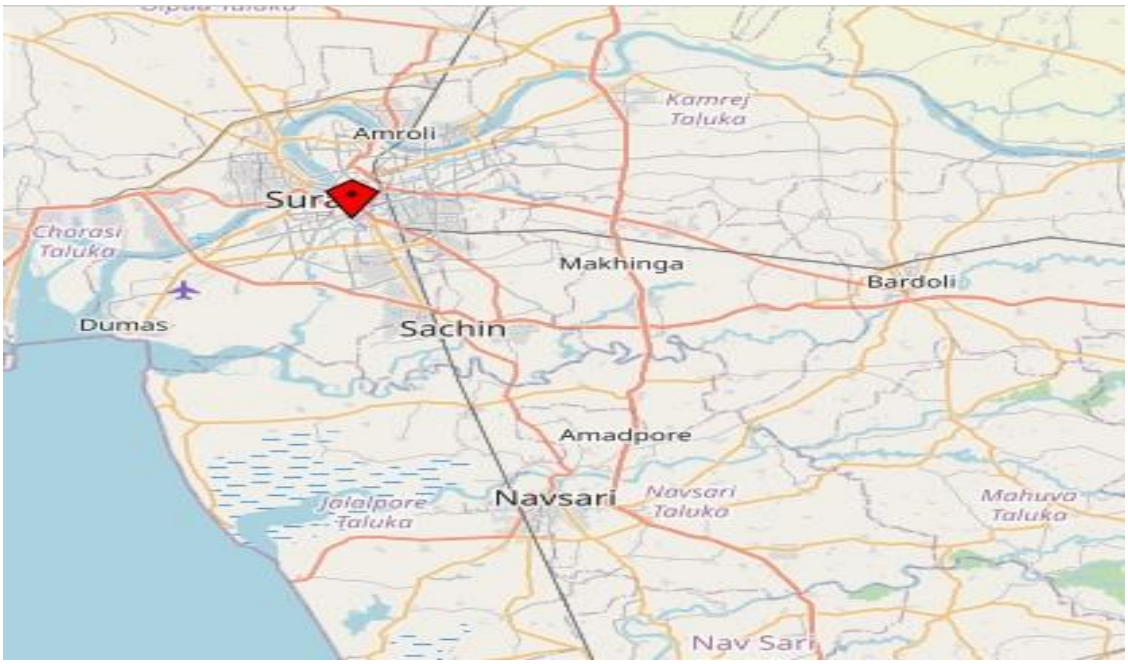


Figure 2 navsari city map

3.1 Demographic profile of Navsari

Navsari district of Gujarat features a total population of 1,329,672 as per the Census 2011. out of which 678,165 are males while 651,507 are females in 2011 there have been a complete of 295,131 families residing in the Navsari district. The typical Sex Ratio of the Navsari region is 961.

As per Census 2011 out of the entire population, 30.8% of individuals sleep in urban areas while 69.2% sleep in rural areas. The traditional education rate in urban zones is 88.9% while that in the country zones is 81.6%. Likewise, the Sex Ratio of Urban regions in the Navsari region is 917 while that of rural territories is 981.

Table 1 Demographic profile of Navsari

Census Year	Area Sq. Km	Total population (lakhs)	Male	Female	Sex Ratio	Density (ppha)
1941	1.72	0.35	18,645	16,325	759	203.48
1951	1.72	0.45	23,100	21,900	785	261.62
1961	3.89	0.54	27,856	26,144	798	138.81
1971	4.85	0.75	37,832	37,168	830	154.63
1981	7.32	1.06	54,800	51200	868	144.80
1991	8.56	1.26	63,977	62,023	897	147.19
2001	8.56	1.36	69,897	66,103	920	158.87
2011	18.05	1.60	82,925	77,175	931	88.64

Source: Census of India

3.2 Existing transport mode:

Table 2 existing scenario

Sr.	Transport type	No. of vehicle
1.	Local ST bus	24
2.	Express ST bus	20

3.3 Regular trip:

Daily Navsari to surat trip 2200 to 2500 by ST bus and express bus.

4. Data collection:

I. Geometric Feature Survey

Geometric feature survey was the first survey taken place for this study. It was done at the very first at selected site. The width of the road was the most important measurement as it eventually leads to finding out the capacity of the road. The features of the road covered in this survey were foot path width, presence of shoulder, median width, no. of marked lane, lane width, and signal characteristics (marked or unmarked) etc.

II. Roadside Land Use Survey

In the selected study area (specific section) the road side adjacent plot were surveyed. Information about height, frontage, no. of stories, and total floor area and floor wise use of every building were collected.

III. Trip rate Analysis and Modal Share Survey

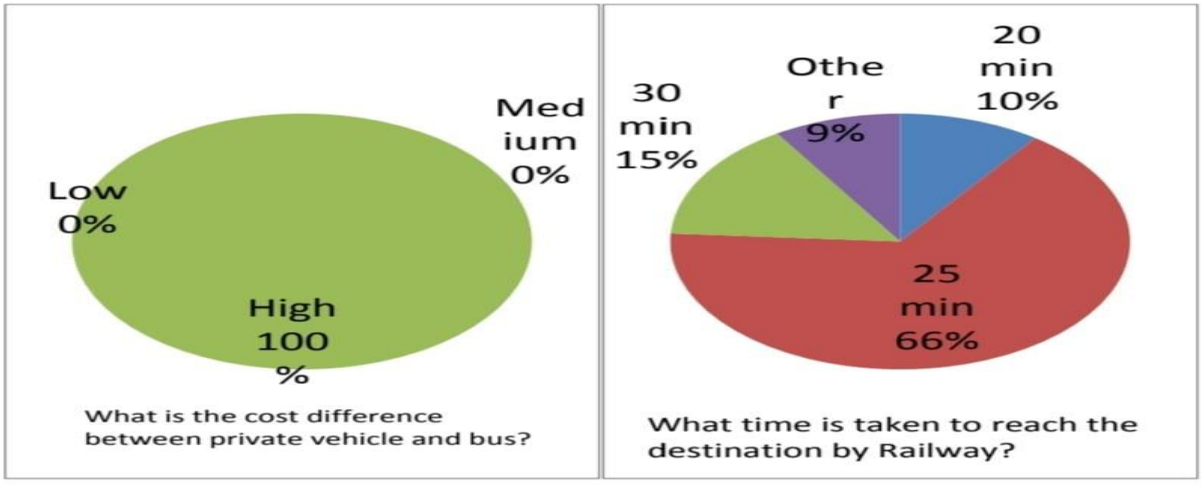
To find out the trip rate from different categories of land use, 8 hour survey has been conducted in some selected structures adjacent to road between Surat Navsari. Total no. of person entering in that structure/land use and total no. of persons going out is tallied out over the period of 8 hour. Then it is converted into maximum and average hourly trip (total in and out in one hour at peak time and in average). Then the total floor area of that structure/land use has been identified to convert the trip rate into **per 1000 sq.ft per hourly trip**. The mode choice behavior of the users of any land use has been identified through asking them their arrival mode (primary mode before entering the structure) and their probable departure mode (primary mode after leaving the structure). The modal share percentage then calculated from the survey data.

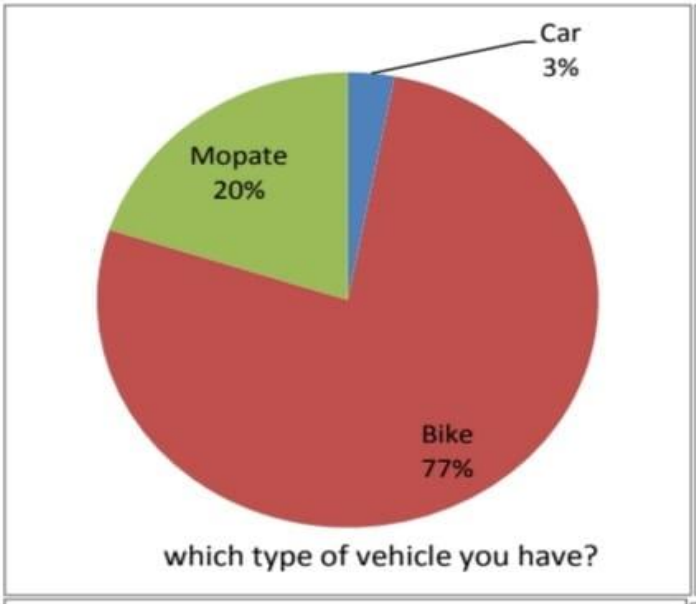
IV. Volume Survey

The points were selected keeping the traffic add and subtraction in mind. Total 8 hour survey has been conducted considering 2 peaks (7:30 AM-10:30 AM; 7:00 PM-10:00 PM; and 2 off-peak (11:00 AM-12:00 PM; 3:00 PM- 4:00 PM)hours. After counting all the vehicles of different types of different times, the total number of the vehicle was converted into PCU/Hr (Hourly Traffic Flow). Section wise PCU in Peak, Average and Off-Peak Hour is then calculated from survey data.

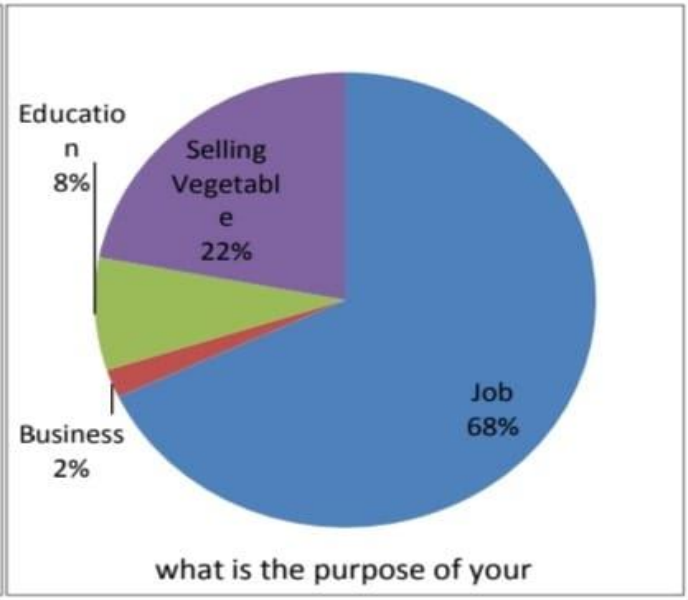
V. Speed Survey

The speed survey was done using the moving observer method. I traveled the road (twice) in seven different times and vehicle used for the journey is Car. The journey time, running time, intersection delay, overtaking, over taken vehicle was counted.

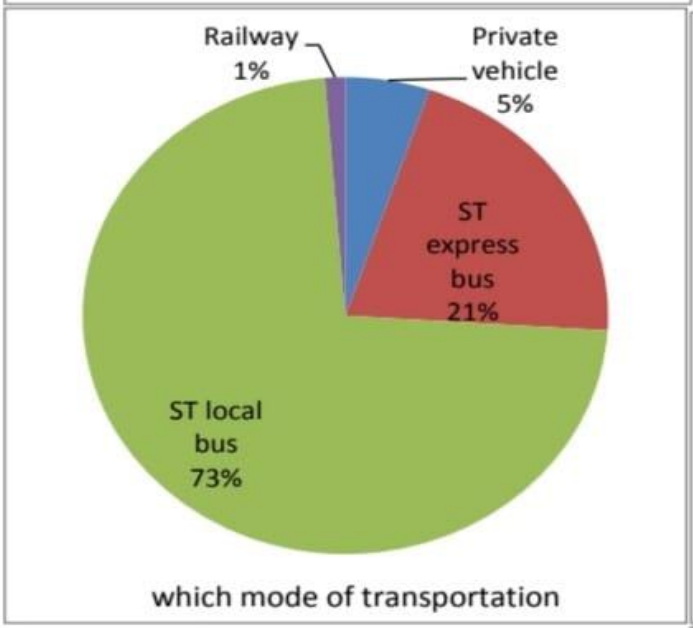




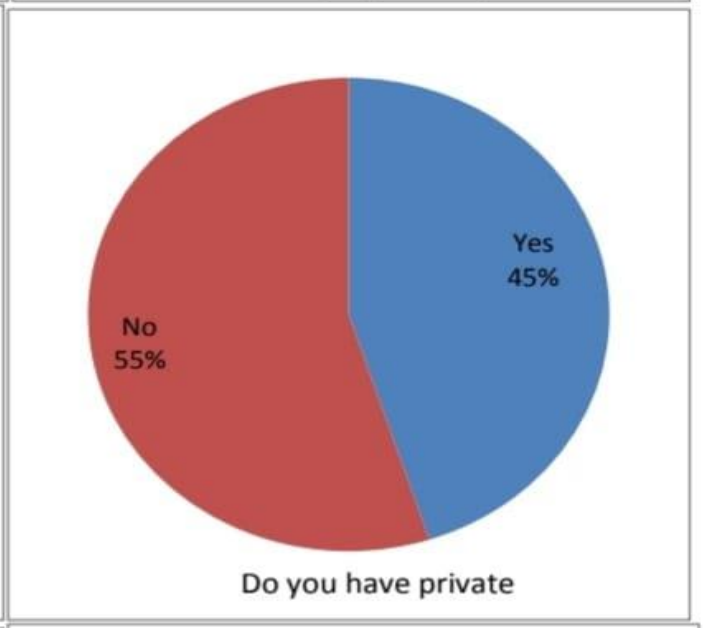
which type of vehicle you have?



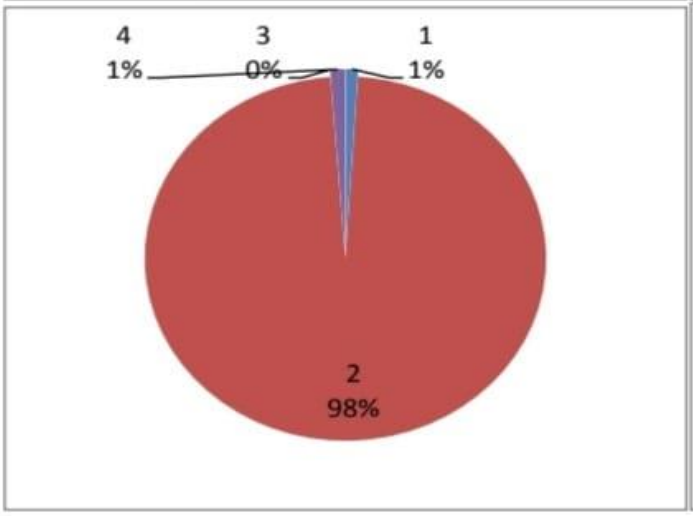
what is the purpose of your



which mode of transportation



Do you have private



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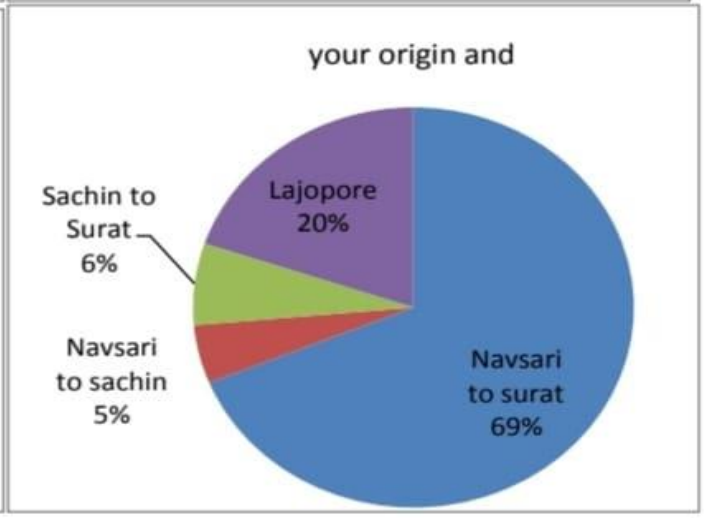
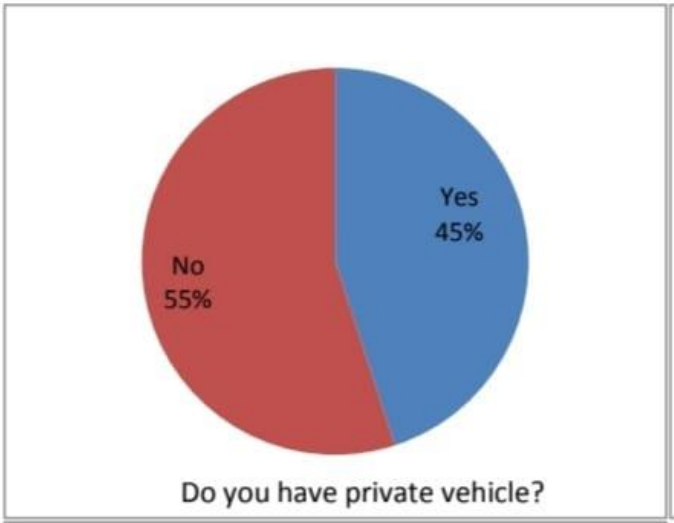
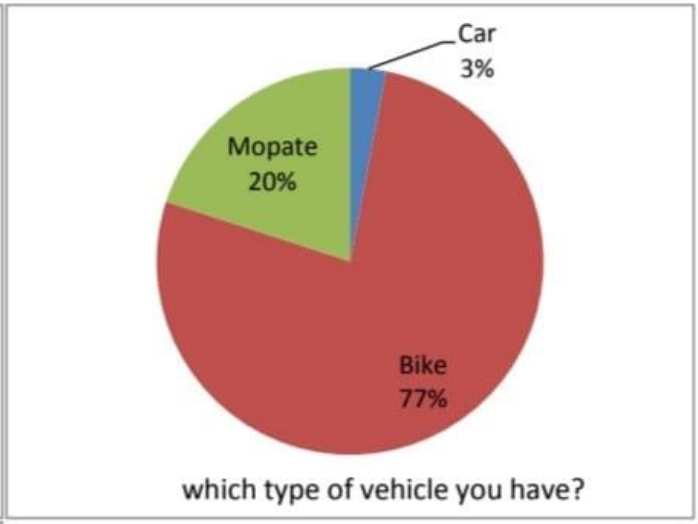
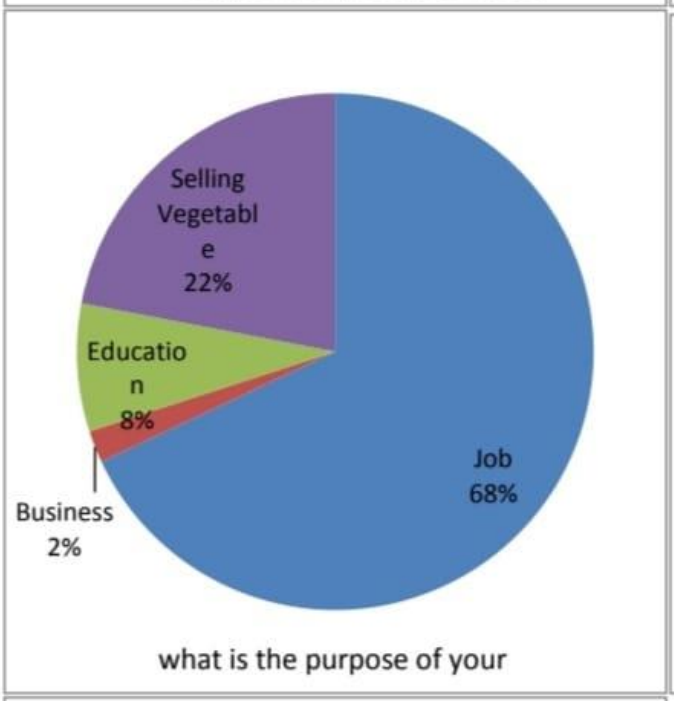




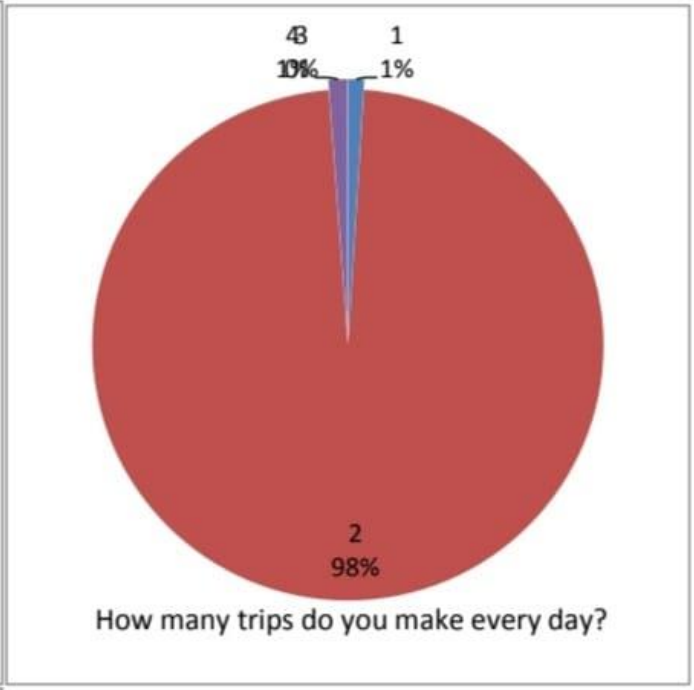
Do you have private vehicle?



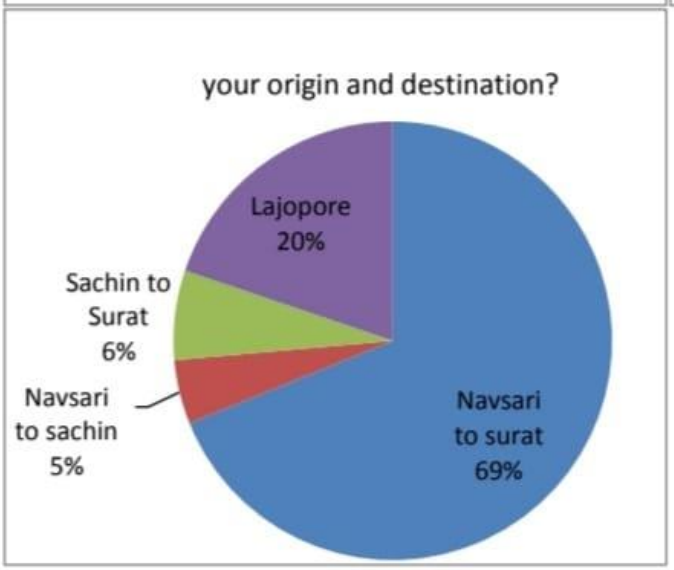
which type of vehicle you have?



what is the purpose of your



How many trips do you make every day?



5. Recommendation

a. BRTS between Surat – Navsari
b. Electronic auto rickshaw
c. Increase the no. of buses
d. Develop the green belt area between Surat – Navsari
e. Increase the railways
f. Plotted Tp scheme
g. Provision of basic amenities in linkage area

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