THE IMPACT OF LAND USE ON TRIP GENERATION AFFECTED BY POPULATION A CASE STUDY OF UNA CITY

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Abstract

Trip generation is the first and most important step for the travel demand behaviour. Trip generation is directly or indirectly depend on socio- demographic data. The socio-demographic data deals with the age, sex, education level, income level, marital status, occupation, religion, birth rate, death rate, average size of family and average age of marriage. These all factors combines creates the huge effect on the increase and decrease of the population and the population actor also influenced the rate of generation of trips. Higher the population creates the mixed land use pattern which enhances the transportation facility cause the better and easy approach towards the transportation. It will directly leads to the higher generation of trips. As the high population, the number of work individuals is also increased may also create the more trips which may cause the congestion at peak hours and which also cause harm to the environment. To avoid all the futuristic problems will be caused by the trips, it's a vital role to study the land use pattern and the rate of trip generation in such a way that may predict the optimum use of the variety of land in such a way that the available land not be in excessive use where not required and also use of the required land for the further development of the town with the provision of highly advanced transportation facility.
Key Words—Land use pattern, trip generation.

I. INTRODUCTION

In the time of initial development and new development of any area in any country has the huge potential to create a huge effect on the surroundings of that area. As the ratio of the development of the infrastructures rises day by day, it will make the area more crowd than before. As the population increases in any developing area, the requirements of the daily consumption of the daily based material will increase. By the need of this, the area will requires further development

of infrastructure. As the population and infrastructure increases, the requirement of the land use will increases also. At the beginning stage of any development of any area, needs the transportation facility, in such a way that, by the use of the transportation facility the development growth of that area will succeed with the high and smooth growth ratio in all the sectors and sub-sectors in parallel way. As a balance is maintained in between the land use for different types in any developed or developing area of any country, the trip generation would be maintained and optimize from their point of origin and their point destination of an particular area in such a way that the analysis of traffic generation for a particular period of time is suitable and also to examine the existing facility and also the required facility of parking in an particular area to avoid the choking of the traffic at their peak hour. The relationship between the trip generation and local built environment remains far from entirely resolved, despite several activities was already done in the past of the time.

The land use factor on the use of land and their travel behavior or trip generation is highly important to travel demand modeling forecasting. As the variety of different land use directly affect the intensity of trip generation. There is a lot's of importance of different varieties of land use factors on household daily trips generation rate and household kilometers travelled. All the major facility is saturated at the center of the city where generated traffic is very high in compare than the available area to handle the traffic. There is a lots of different modes of land use at the center of the city where mostly all the trip generation may passes. Most of the people from low to average class are living in Una city/town or near about the Una city/town, by the virtue of which the trips are mostly passes through the center of the city.

In addition with the rapid economic transformation of the people and increase in population, the center of the city expanding without proper planning and control resulting in improper and imbalance pattern of the trip generation. Due to which, many of the times the traffic chocks at the center of the city. This situation is mostly served in the center part of the "Una" city near the bus terminal of Una city.

The integrated use of land and planning of current transport with the modification of the existing transport facility can be regarded as an effective way to solve the most of the problems at "Una" city where it required the most.

The Una town under the MC limits having the 11 no. of wards with their different ranges of population and population affects the trips generation rate. As per the latest population census in 2011, Una town having the population is 18722 and additional requirement use of land is 402.85 hectares and also proposed land use is 635.96 hectares but as per the records of 1986, the existing land-use is 635.96 hectares.

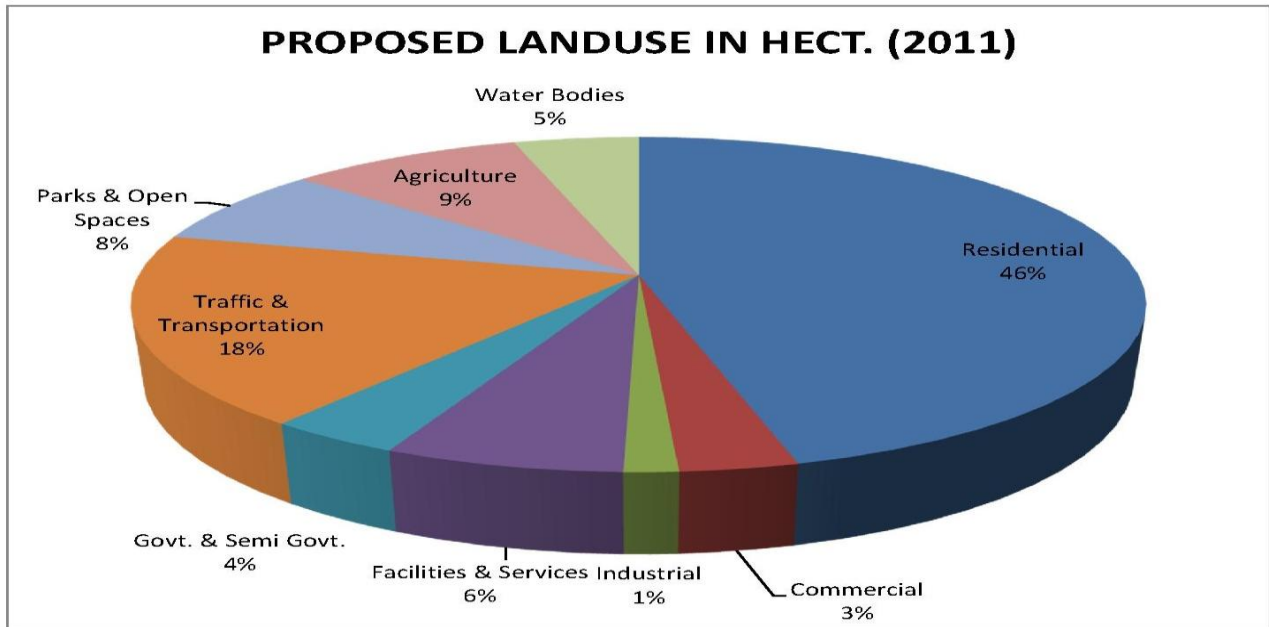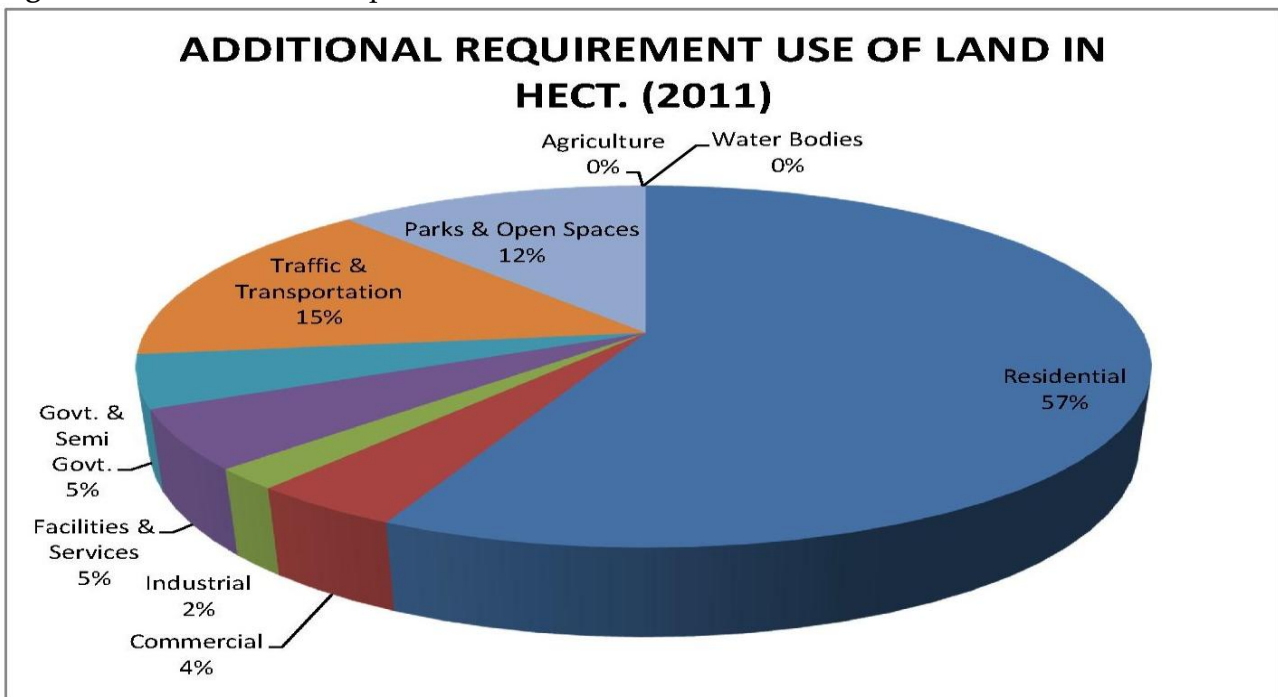**Figure No. 1:** Proposed Land Use in 2011

Figure No. 2: Additional Requirement Of Land Use in 2011

II.   METHODOLOGY

For the research purpose, Una town is selected because it is the one of the most developing area in district Una in the state of Himachal Pradesh. In Una, higher rate of development causes the fast moment of traffic which may creates the trips and also attracts the surrounding traffic for the experience of travel and trips. The study of area is based on the population and crowd criteria. The groups or zones (wards) having the minimum, moderate and highest population as per the latest revised Government census records is selected for the study and the collection of the data. The collection of the data is done by conducting the "Home Interview Survey" and collects the information regarding their profession, age, work, gender, time of journey, mode of transportation etc. which is directly changes the rate of trip generation and also affected by the population. For the collection of data, in the whole zone, we randomly select sample of individuals and perform interview to gather the information.

The collected data is based on the statistical data and the procedure adopted for the collection of data is as under.

i.   Select the area having the residential population as per the records of population census 2011.
ii.   Scheduled the sample of 100 no. of individuals under the area of MC limit of Una town.
iii. Conduct the "Home Interview Survey" and gather the information regarding the statistical data.
iv.   Tabulate the gathered data based upon the purpose, age group, purpose, time, mode of transportation or vehicular ownership.
v.   Compare the data with each other on the basis of generation of trips.
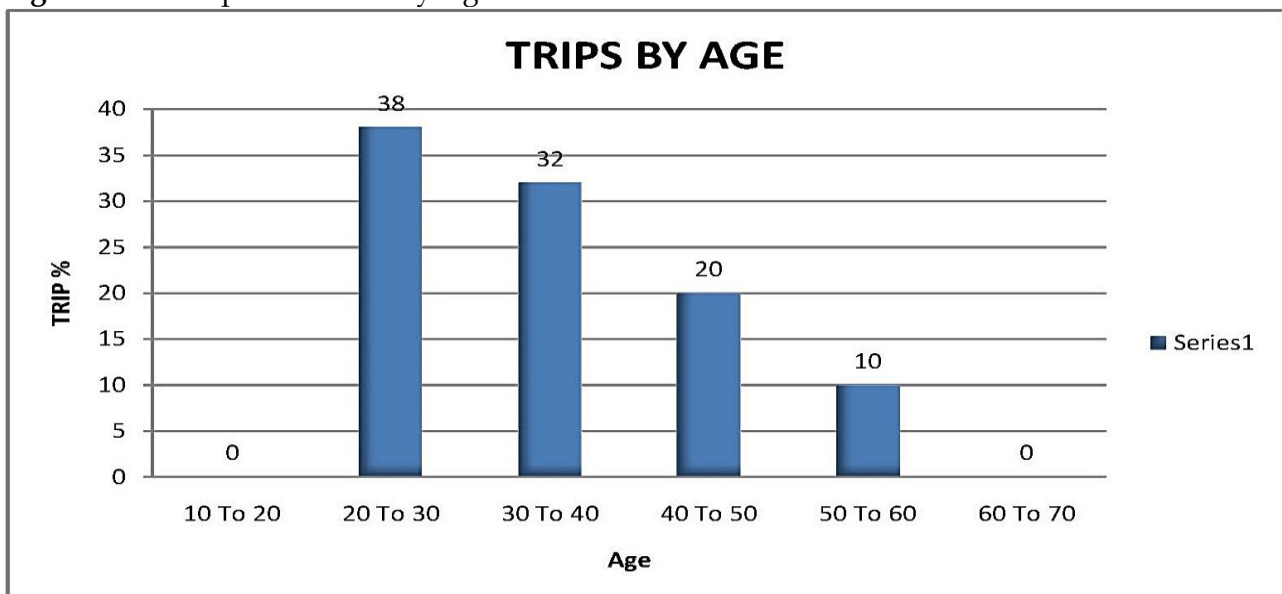
Figure No. 3: Trip Generation By Age.

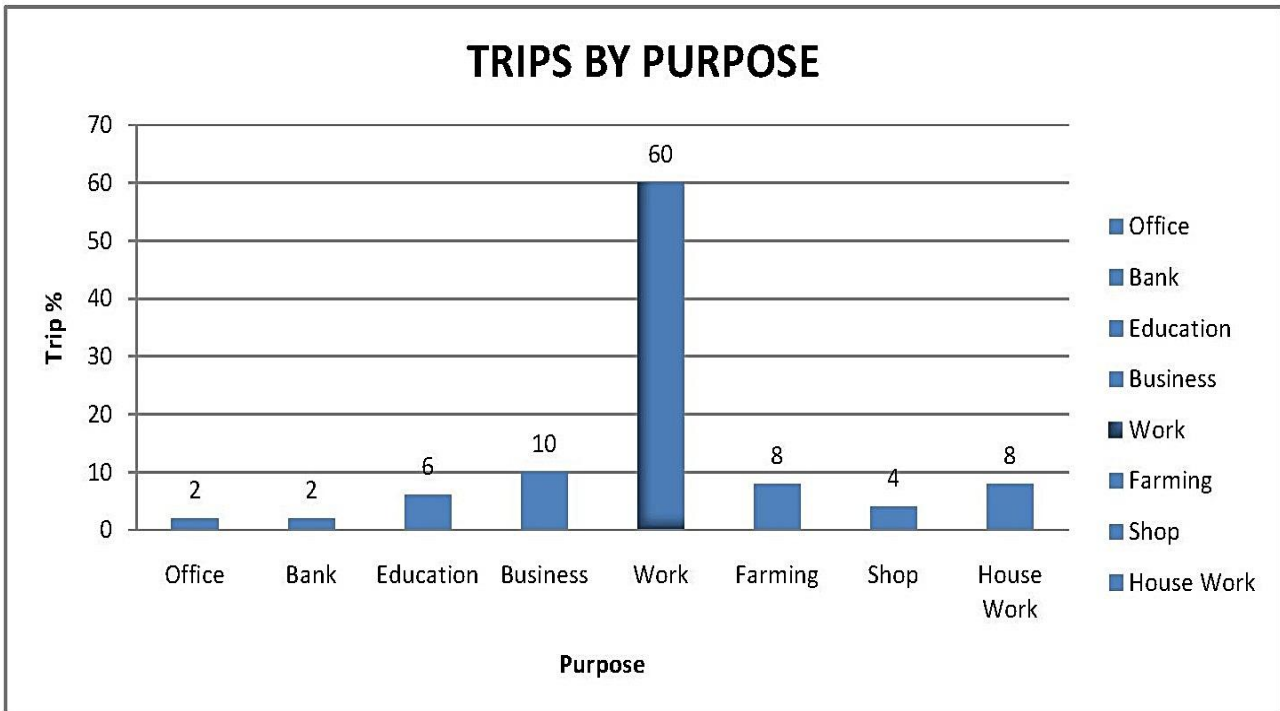**Figure No. 4:** Trip Generation By Purpose.

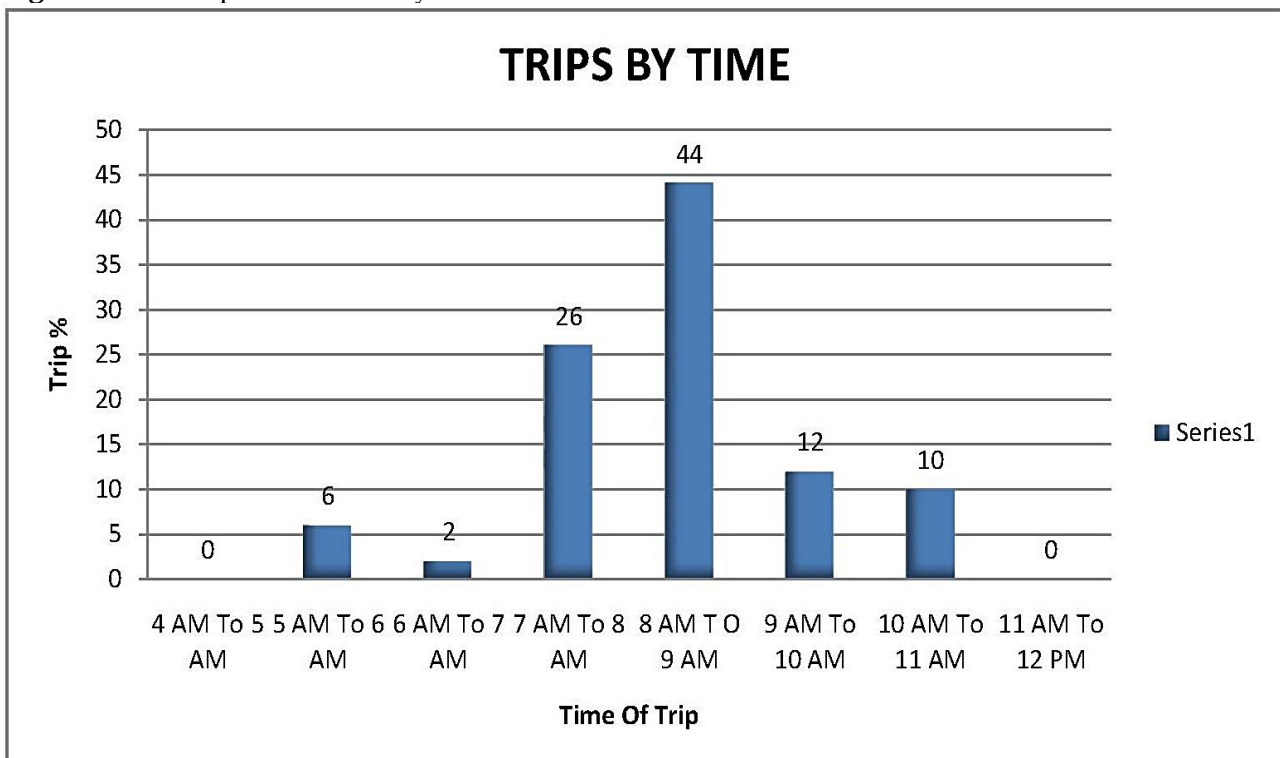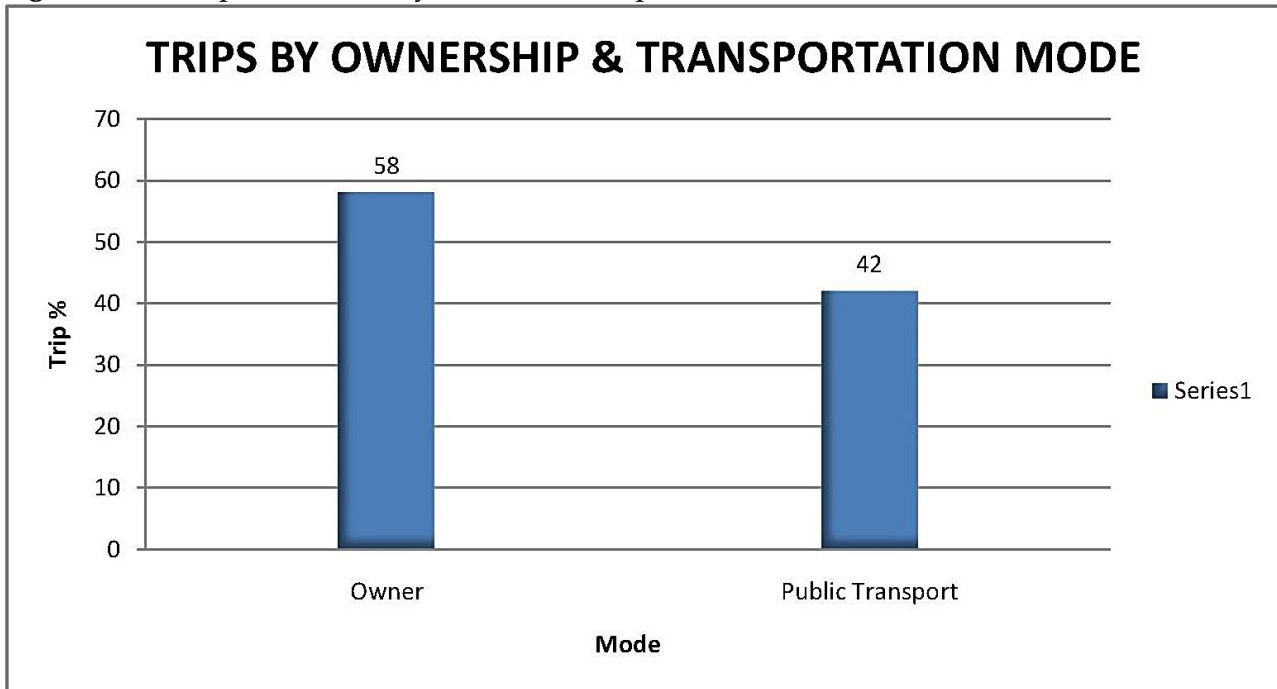**Figure No. 5:** Trip Generation By Time.

Figure No. 6: Trip Generation By Mode Of Transportation

As the age's increases, the trips generation will be lesser in compare than the previous trips. In the analysis maximum no. of trips is generated by the age limit of 20 to 30 of individuals and as the age's increases, the rate of trip generation is reduced. The individuals having the age of 30 to 40 and 40-50 is mostly generates the moderate rate of trips. But after the age of 50 years, the trips of individual are reduced to 10 percent.

Generation of trips is also dependent on the purpose of the individuals. Every individual having the different purpose to make their trip sometimes multiple trips in a day. All the individuals having their different routines of work and profession for which it generates the trips for their fulfillment.

Maximum of the individuals approaches their routes in between the time of 7 AM to 9 AM and it records 70 percent of the individual generate the trips in between the time of 7 AM to 9 AM to achieve their daily routine schedule. In all the zones, maximum no. of individuals generates trips to approach their destination, it may be in the limit of town or may be out of the town. In both the cases, the individuals passes through the centre of the city which may creates the congestion and jam. In the morning time 7 AM to 9 AM may be considered as the peak hour of the trip generation. As the time passes, after 9 AM, the trips is gradually decreased and reduced upto the optimum generation of the trips and may be the multiple trips of the same individual for their different purposes.

The use of transportation either be own vehicle or ownership or by the use of public transport. If the trip generation is done by the use of own vehicle, it will reduces the space for the traffic

medium and by the use of the public transport, the most portable transport and convenient transport and helps to reduce the congestion. It depends on the income of the individual and also the lifestyle of the individuals. Most of the preferable transportation by the individual is own transportation and 58 percent of the individual's uses their own transportation for the generation of trips.

III.   RESULT AND DISCUSSION

As a result by doing the analysis of ground data, trips is generally generated by the individuals is based on the age group, purpose of trip, mode of trip and the time of trip. Basically, time of trip is a major factor by which peak trips is generated in compare than others due to which creates congestion and restrict the proper flow of traffic. Every individual with any purpose, any age or any mode of transportation is directly affect by the time of the trip generated and also affects by the population. As the population increases, the variety of the individuals also increases and also the trips will increase because more of the number of populations will be available to approach to their destination places. But, by the time factor, maximum number of the population will be approach at the time in between 7 AM to 9 AM which will make the congestion and collapse the movement of the traffic.

All the data is analyzed on the fluctuation of the population by taking the sample of 100 numbers of individuals in MC limit of Una town in Himachal Pradesh and as per the latest population census which recorded in 2011 is 68.65 Lakh i.e 6865000. The percentage of analytical population is 0.001456 percent and the output result shows about 70 percent of the average total population scheduled their time in between 7AM to 9 AM for the generation of the trips to reach their destination places. In other way, it may possible out of the total population of the Himachal Pradesh 70 percent may be approach their daily scheduled routes and use transport network to reach their destinations i.e 48,05,500 number of individuals used the road network's in 2011. But, the projected population of Himachal Pradesh near about 75.71 Lakh in 2011 i.e 75,71000 and as per the projected increase in the trips, it may also 70 percent of the total population i.e 5299700 number of individuals may use the road networks at the same time to approach their destinations.

IV.   CONCLUSION AND SCOPE FOR FUTURE STUDY

The aim of this study is to find out the correlation of generation of trips with the dependent statical and socioeconomic variables directly affected by the population. The Government employees and the private employees is generally use the private vehicles to approach their destinations but in local areas. As the distances is increased, the priority of the individuals to start their trips by the use of public transportation. Most of the peoples prefer to use the economic transportation facility of any kind. The students is always use the public transport, house wife's is also prefer the public transportation and sometimes the generation of trips is multiple for the same purpose or different purposes at the same time or different. Maximum number of the individuals uses the light weight i.e two wheel transportation if uses own transportation service to approach their destination.

For the future study, it is very important to analyze the trip generations of any particular area to pre-judge the capacity of the road network to bare the current traffic and also to judge the upcoming traffic in such a way that the pre-planning and requirement of the re-designing of the

maximum possibilities of new networks and also provision of the extension of existing road in such a way that, the upcoming generation of traffic is sure to be free flow without any congestion and by providing the maximum safety of the passengers and also the pedestrians.

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