

Modelling Trip Generation For Work Trips For Vatva GIDC Area

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Abstract : In a transportation study, it is often necessary to know the exact origin and destination of the trips. It is not only necessary to know how many trips are made, but also group these trips with reference to the zones of their origin and destination. Other information yielded by the O-D survey includes land-use of the zones of origin and destination, time of the day when the journeys are made, trip route, trip purpose, and mode of travel. Origin is defined as the place where the trip begins and destination is defined as the place where the trip ends. In present work attempt has been made to develop regression model for work trips at Vatva GIDC. For this purpose data had been collected using work place interview method. The developed trip generation model would be helpful in prediction of future trips.

Index Terms – Trip generation, Trip attraction, Regression analysis.

I. INTRODUCTION

Urban transportation covers the movement of both people and goods within an urban area. At the individual level, urban transportation can be characterized by a trip. However, at the millions of these individual trips define urban transportation (Barber, 1995). A trip is as a journey made by an individual between two different points. Each trip is performed using one or multiple transportation modes for a defined purpose at a given time. Although a trip may involve more than one purpose, it is usually identified by its principal purpose (Hobbs, 1979).

Trip generation analysis, as Meyer (1974) puts it, seeks to estimate the volume of trips that will be made by individuals to work, shopping, school, and so forth, but not the flows between points within the whole system. The functioning of urban city is highly dependent on the movement of people, goods and information (Muller, 1995) and trip generation studies are vital part of transportation planning, due to the recursive nature of urban transportation modeling procedure (Bruton, 1986; Badoe and Steuart, 1997).

Personal trips are commonly classified based on their main purpose (Barber, 1995); work trips, shopping trips, social trips, recreational trips, school trips, home trips and business trips. This study focuses on industrial trips, and the factors that determine the aggregate number of industrial trips generated in urban areas.

Trip generation is the initial step in the classical travel demand modeling process. It provides the total number of trip productions and trip attractions for each zone of the study area or TAZs (traffic analysis zone). These trip productions and attractions usually are expressed as daily persons or vehicle trips, and are further categorized by the purpose of the trip. For this project trip rates are expressed as person trips/day.

II. LITERATURE BASE

Hiren Rudani conducted study to develop trip generation model for truck trips at Gozaria GIDC. Freight transportation is very important for development of nation. Generally Freight Transportation on highway is conceded out by trucks. The aim of this paper is to developed truck trip generation model for Gozaria and Visnagar GIDC. The company travel diary survey has been accepted out by company by the survey. The model has been developed using multiple linear regression analysis by Regression Tool of MS Excel, which inaugurates relationship between the daily number of truck trips per day generated by the total floor area of industries, total weight of production in tonne and total weight of raw material in tonne. A general model for truck trip generation has been developed. The model result gave an effective value of R² equal to 0.9421, representative that the explanatory variables included in the model explain 94.21% of the dependent variable. The model also validated by Mehsana GIDC. Accurate predicting of future truck trips using this model can be done.

In linear regression analysis, R²= 0.9421 indicates very good linear relationship. The significant parameters are, total weight of production, total weight of raw material and total floor are of industry for generation of truck trips per day. Total truck trips observed in Gozaria and Visnagar GIDC is 534 /day, out of which 278 are incoming trips/day and 256 are outgoing trips/day. The maximum companies in GIDC are of plastic, stonework, machinery and chemicals.

Divya Priya conducted study to develop trip generation model using activity based approach. Trip generation for work is one of the main purposes of travel in the urban areas. Activity based methods predicts behavior of traveler as derivative of activities. By predicting which activity performed at particular destination and time, trips and their timing and locations are used to develop activity based trip generation models. The aim of this paper is to develop activity based trip generation model which addresses shortcomings of the conventional trip based approach.

In this study, trip generation model phenomenon has been studied for households in Trimurti Nagar in Nagpur city. Home-interview method is adopted to collect data to develop the trip generation model. The goal of the paper is to determine activity travel pattern behavior of individual and development of activity travel pattern choice model for work commuters and calculate the aggregated travel demand for Transportation Analysis Zone i.e. Trimurti Nagar, Nagpur

III. STUDY AREA

Once the nature of the study is identified, the study area can be defined to encompass the area of expected policy impact. The study area need not be confirmed by political boundaries, but bounded by the area influenced by the transportation systems. The boundary of the study area is defined by what is called as external cordon or simply the cordon line. Interactions with the area outside the cordon are defined via external stations which effectively serve as doorways to trips, into, out of, and through the study area. In short, study area should be defined such that majority of trips have their origin and destination in the study area and should be bigger than the area of interest covering the transportation project.

Ahmedabad also pronounced as, Ahmedabad in Gujarati, is the largest city and former capital of the state of Gujarat. It is the administrative headquarter of the Ahmadabad district and the seat of the Gujarat High Court. Ahmedabad's population of 5,633,927 (as per 2011 population census) makes it the fifth most populous city in India, and the encompassing urban agglomeration population estimated at 6,357,693 is the seventh most populous in India. Ahmedabad is located on the banks of the Sabarmati River, 30 km (19 mi) from the state capital Gandhinagar, which is its twin city.

The journey of Vatva industrial estate and Narol industrial started in the year 1968, when GIDC took step to initialize the industrial revolution of Gujarat. These are one of the oldest and largest industrial estates in the Gujarat, spread over an area of 618 hectares and have over 2800 units in multiple phases. These both estates are part of Ahmedabad Municipal Corporation.

Both industries have un-interrupted power supplies and a special high-tech telephone exchange to serve its various units. Both estates houses most of all types of industries i.e. from pin to plane parts.

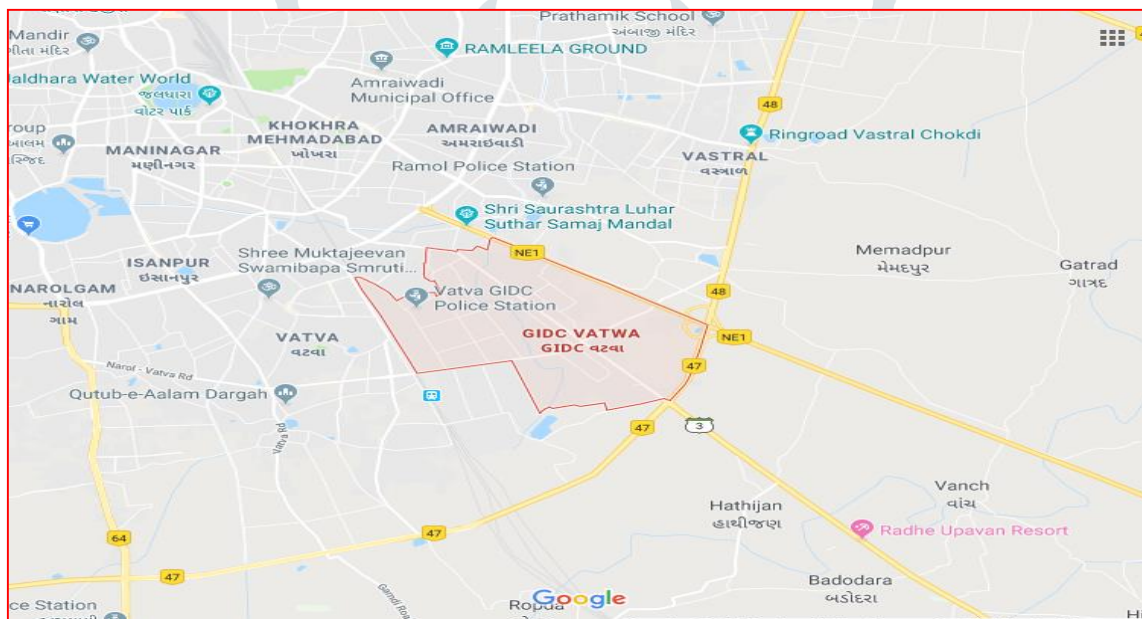


Figure 1:- Vatva GIDC map

(Source:- Google maps)

Number of units in both industrial estates = 2800 units

Area of industrial estate = 618 hectors

Revenue generation = More than 10000 crores per annum

Forex generation = More than 3000 crores per annum

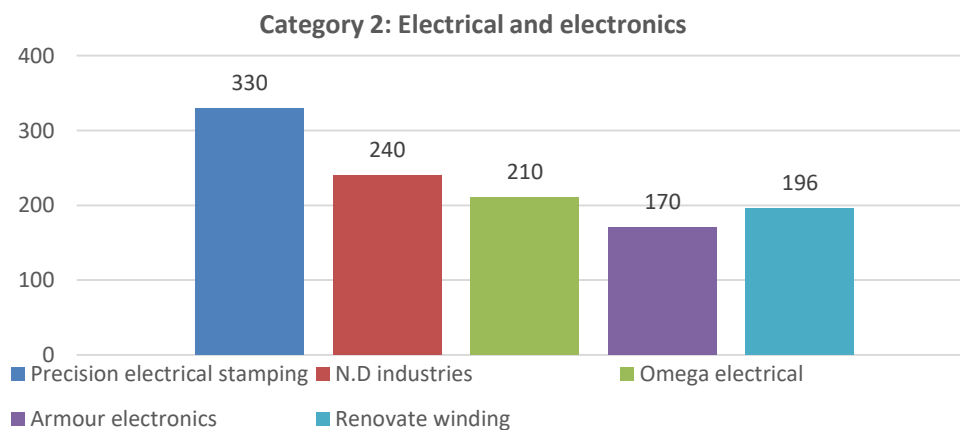
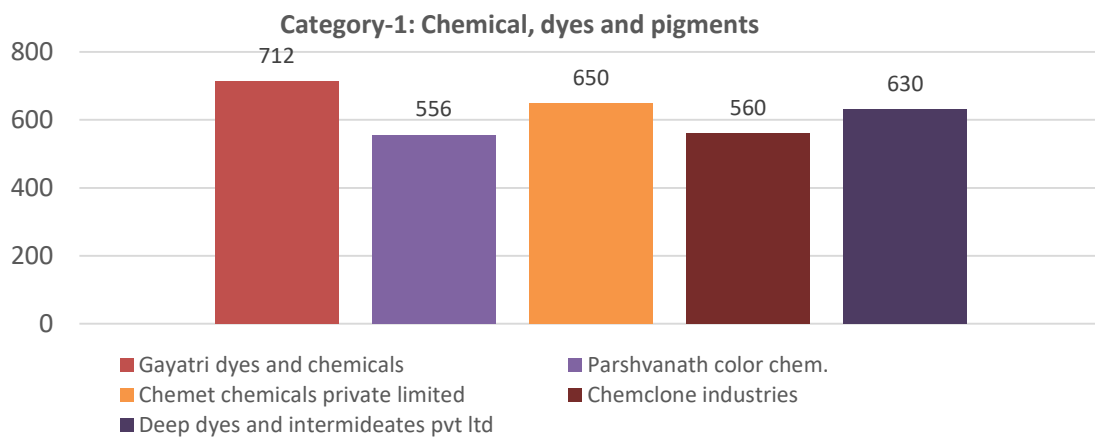
Employment = More than 1, 20,000 people

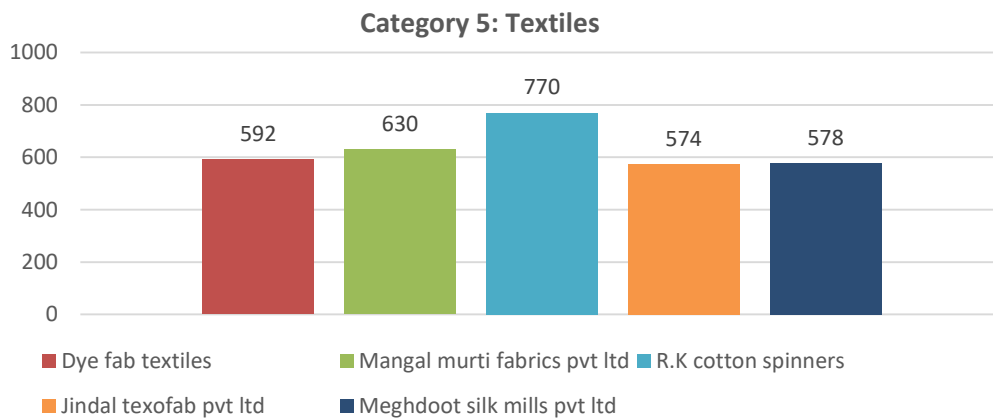
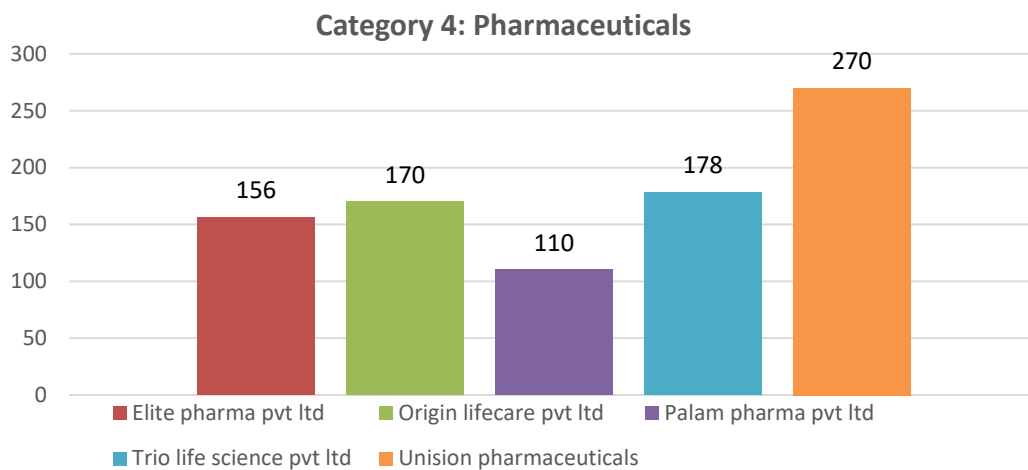
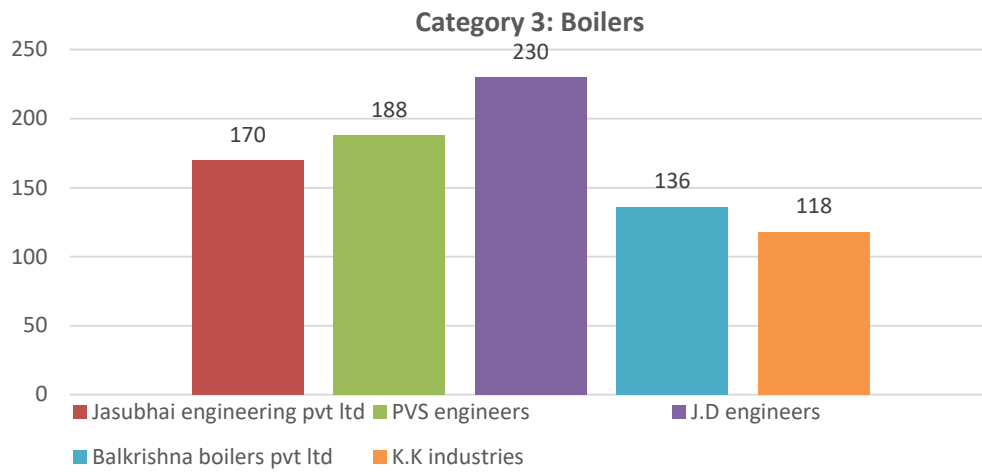
Table 1:- Category of industries

Chemical, dyes and pigments	Electrical and electronics	Boilers	Pharmaceuticals	Textile
Gayatri dyes and chemicals	Precision electrical stamping	Jasubhai engineering pvt ltd	Elite pharmapvt ltd	Dye fab textiles
Parshvanath color chem.	N.D industries	PVS engineers	Origin lifecarepvt ltd	Mangalmur ti fabrics pvt ltd
Chemet chemicals private limited	Omega electrical	J.D engineers	Palampharmapvt ltd	R.K cotton spinners
Chemclone industries	Armour electronics	Balkrishna boilers pvt ltd	Trio life science pvt ltd	Jindal texofabpvt ltd
Deep dyes and intermediatespvt ltd	Renovate winding	K.K industries	Unision pharmaceuticals	Meghdoot silk mills pvt ltd

IV. DATA COLLECTION

Work place interview method had been used for collection of data.





V. MODEL DEVELOPMENT

Trip generation is the first step in four stage travel demand forecasting process. In this section I am trying to develop trip generation model using regression analysis. Regression analysis is the technique used for predicting future trips. Trip is considered as one way movement between starting point and ending point. I am trying to develop trip generation model for one of the major industrial area located in Ahmedabad. As most of the industries are running for 24 hours the trips considered are originating from the industrial area. Both employee trips and goods trips originating from the study area have been considered for development of trip generation model.

Trip generation model for employee trips

Considering above dependent and independent variables various models had been developed. The model having good statistical parameters is as below:-

$$Y = 9.91 - 1.17X_1 - 1.53X_2 - 3.71 X_3 - 2.39 X_4 + 9.54 X_5$$

Table 2:- List of variables used in the Employees trips generation model

Independent variables	
X1	Age
X2	Travel time
X3	Travel distance
X4	Travel cost
X5	Income
Dependent variable	
Y	Number of employee trips

For this equation regression statistics obtained are tabulated as follow:-

Regression Statistics	
Multiple R	0.796862
R Square	0.817317
Adjusted R Square	0.838471
Standard Error	7.218974
Observations	9124

VI. CONCLUSION

Following conclusions were drawn from the study:-

- ❖ The maximum companies in GIDC are from Chemical, Pharmaceuticals and textile sectors.
- ❖ The two – wheeler trips found to be most common mode of trips for employee trips.
- ❖ From the employee trip generation model it was observed that travel time, trip distance and travel cost have negative impact on trip generation. Hence due to increase in this parameter the decrease in trip production observed.
- ❖ Income has positive impact on trip generation which means that increase in income leads towards increase in trip generation.

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