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Vehicular Trip Generation Modelling in Maiduguri Metropolis

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Abstract

The purpose of the trip and modeling process is to identify those meaningful determinants of trip making behavior, and express their effect in mathematical way so that they can be used with confidence as a predictive tool. In the case of this study, data was collected through questionnaires to the various household in the study area. Two zones, namely-: State low-cost and Moduganari in Maiduguri Metropolitan Council. Thirty (30) households were interviewed in the state low-cost. Thereby extending the result collected over the whole houses in the study area. Similarly in the other zone seventeen (17) houses were considered later on it extended to the whole area. In state low-cost zone (2424) number of person trips per day was estimated, In Moduganari (4027) number of person trips per day was estimated. Of the various models of trip generation model, regression analysis was adapted for this work.

Introduction

Transportation has a very important role to play in general development of the country and especially in its economic development. It has been described as the vein and arterial for the flow of the economy of the Nation. In a developing country like Nigeria the goal of industrial development can be achieved through an efficient transportation system. Our social, cultural and political institutions can be built up and life of the people in general can be enriched through efficient transportation systems. Maiduguri being the capital state of Borno located within the northern part of the country and is presently witnessing rapid growth in population, economic activity, vehicular ownership and hence rapid traffic growth. Increasing urbanization gives rise to vexing problems of congestion. If metropolitan areas are to grow and prosper, it will be imperative to plan and build vast new facilities for public and private transport. These, as well as existing resources must be operated, so as to provide the largest possible free flow of traffic. But if a reasonable level of amenity is to be maintained, the added facilities must be planned to make a sparing, efficient use of land, convenient to uses, and to make a positive esthetic contribution to the environment. Transportation facilities are the basic requirement for community growth and development. With the huge capital investment required to finance urban projects of all kinds, the consequences of not planning have became more acute than ever, successful solutions to the complex mobility problems confronting urban areas throughout the nation require the full energies and imagination of many professionals, but particularly of the traffic engineer. Transportation in general and particularly highway transport play an essential role in the life of any communication today. Good highways transport facilities are the result of sound planning. It is now being recognized that transport planning cannot be and must not be isolated from land use planning. Also when planning for the future, account must be taken for the vehicles in which people wish to travel and move their goods. In recent years, planners have developed methodologies for estimating the distribution of future traffic over an entire transportation network. These procedures have been used for both urban and statewide. Systems, involve the use of computer simulation programme comprised typically of five types of models:

1. Land use
2. Trip distribution
3. Trip generation
4. Traffic assignment
5. Model split

The models are mathematical equations and procedures that collectively relate travel patterns to land use, demographic characteristics, and parameters of the transportation system. The models are developed and “calibrated” for a given study area so as to reproduce existing travel patterns as determined from actual count. Assuming the basic relationships between travel, land use, and socio-economic characterics remain constant over time, planners use the models to evaluate future alternative land use and transportation system (Pignataro L, J 1973). Among the five models mentioned above, the trip generation model will be used for these analalysis of result.

Trip Genereation Models

Trip generation models are concerned with the estimation of the number of trips into and out of various traffic zones. This is based on the principle that land use generate trips, and that the number and type of "from home" trip is influenced by socio-economic variables such as car ownership or availability, house-hold income and size, occupational status, household composition e.g. no of workers per household. As may be gathered from the above, the number of variables considered to exert a casual effect on trip generation can be very great (Hobs F, D 1973).The traffic analyst has a choice of these methods of developing trip and models:

1) REGRESSION ANALYSIS METHOD
2) CATEGORY ANALYSIS METHOD
3) EXPANSION FACTOR METHOD

Aim and Objectives of the Study

The aim and objectives of the study is divided into the following phases:

1) Inventories of the main traffic facilities, public transport services, present and future land uses, and appropriate population and economic data.
2) The determination of the existing interzonal travel pattern, and the factors which control them.
3) The determination of the manner in which the travel growth characteristics of individual zones interact and affect future travel distributions between zones.

Scope of the Project

The scope of the project is to carry out a survey of vehicular trip, household, in some selected areas in Maiduguri metropolis, taking into considerations of the attracted areas such as commercial centers. A questioner was sent to the selected areas so that all the information required is filled up appropriately. The information is then used to generate trip produced by using some mathematical relationship.

Limitation of Work

The work is limited to Maiduguri metropolis for interzonal trips.

Methodology

Data Collection And Analysis

Data was collected from two areas within the metropolis in state low cost and moduganari in Maiduguri metropolis. These data will be analyzed to calculate the future trip, by understanding the reason behind a particular. The map of the location of study area is shown in the figure below.

Figure: Map of Maiduguri Metropolis

Trip Generation Data

Trip generation is the allocation of trips associated with the traffic zone. It normally consist of daily trips produced by residents in that zone and for the same zone the number of daily trips attracted to that zone. Trip generation is a term used in the transportation planning to cover the field of predicting the future number of trip ends in a given area. The objective of the generation stage is to understand the reason behind a particular trip making behavior and to produce mathematical relationships to synthesize the making pattern on the basis of observed trips, land-use and household characteristics. Transportation studies have shown that 80 to 90 percent of all trips made by residents of urban areas originates or ends at home (Hobbs T, D 1973) Residential land use therefore is a highly important trip generator. For this reason, and also because it exhibits a predictable pattern much of the research on trip generation has been obtained by making a home interview questioning. which was distributed to the various household.

Multiple Linear Regression Analysis

The multiple linear regression analysis has been used in the majority of transport demand studies in the past. The technique is a statistical one most often used to derive estimate of future trip generation, where two or more independent variables are suspected of simultaneously affecting the amount of travel. This technique measures the separate influence of each factor acting in association with other factors. The aim of the analysis is to produce from the traffic, land used and socio-economic data an equation of the following form: $\mathbf{Y=a_o + a_1X_1 + a_2X_2 + ------- + an\ X_n}$, where **Y**= a measure of the change in the number of household occurring in a specified forecast time interval starting from the time

for which the latest data are available.$\mathbf{X_1, X_2}$------$\mathbf{X_n}$ = independent variables, $\mathbf{a_0, a_1, a_2,}$ -----$\mathbf{a_n}$ = regression coefficients In a typical regression analysis, the given data relates the present day values of the dependent variables (Y) and the independent variables (X---- Xn) for all zones of the area under study(Salter 1974). The equation thus developed is used for determining the future value of trip knowing the estimated future values of the independent variables. By considering the data collected in the two zones of study, the dependent variables and independent variable are related to one another in order to obtain the regression analysis equation. The observed data in table 1 and 2 were use in MINI TABR14 for the regression analysis equation. From fig. in table 1 the dependent variables Y is defined as Y_1, which is the total trip generated at a house in a day. The independent variables are: NP_1 = No. of person in household, AA_1 = Average Age, IN_1 = Total income of the house hold and AT_1 =Total time in minute, similarly same technique is applied to the second zone. The depended variable Y in Table 2 is defined as: Y_2 = total trip generated at house in a day, NP_2 = No. of person in house hold, AA_2 = Average Age, IN_2 = Total income of the house hold and AT_2 = Total time in minute.

Assumptions in Multiple Linear Regression

The regression analysis is based on the following important assumptions:

I. All the variables are independent of each others:
II. All the variables are normally distributed
III. All variables are continuous
IV. A linear relationship exists between the dependent variable and the independent variables
V. Influence of independent variables is additive, is the inclusion of each variable in the equation contributes a district portion of the trip numbers.

It is however, difficult to ensure that the basic assumptions are satisfied in most of the trip generation studies. The so called independent variables in the regression equation are not truly independent of each other, and some sort of correlation normally exists among them.

The Likely Sources of Error May Be

a) Errors in the determination of the existing values of the independent variables owing to inaccuracy or bias in the transportation survey.
b) Errors in the determination of the existing values of the dependent variables, also as a result of in accuracy or bias in the transportation survey. Although this may be detected and corrected by adequate screen line checks.
c) Errors in the regression obtained owing to the scatter of the individual values and the inadequacy of data.
d) Difficulties in the prediction of future values of independent variables for the future estimate of the independent variables.

If all the factors influencing the pattern of movement areas were correctly identified, then it might be expected that trip generation equations obtained in one survey would be applicable to other survey in a giving environment.

Analysis of Result

The Multiple Regression Analysis Method

The result obtained from the questioners in the two study zone was obtained by imputing the data in a computer programme which automatically and speeding carry out the extensive calculation required by the process as follows:

ZONE 1

MTB > regress c8 4 c9 c10 c11 c12

The regression equation is

$Y_1 = 5.34 + 0.237NP_1 - 0.0741\ AA_1 - 0.000001\ IN_1 - 0.0504\ AT_1$

Predictor	Coef	St.dev	t-ratio	P
Constant	5.342	1.155	4.62	0.000
NP_1	0.23671	0.05831	4.06	0.000
AA_1	-0.07410	0.02429	-3.05	0.005
IN_1	-0.00000086	0.00000106	-0.81	0.425
AT_1	-0.05035	0.03688	-1.37	0.184

S = 1.142 R = sq = 58.3% R-sq (adj) = 51.6%

Analysis of variance

SOURCE	DF	SS	MS	F	P
Regression	4	45.568	11.392	8.74	0.000
Error	25	32.599	1.304		
Total	29	78.167			

SOURCE DF	SEQ SS
NP_1 1	26.898
AA_1 1	14.840
IN_1 1	1.399
AT_1 1	2.431

Unusual Observations

Obs.	NP_1	Y_1	Fit	St.dev.	Fit. Residual	St. Resid
3	13.0	3.000	5.096	0.856	-2.096	-2.77RX
5	11.0	1.000	3.650	0.416	-2.650	-2.49R
6	16.0	8.000	5.830	0.523	2.170	2.14R
10	3.0	3.000	1.406	0.884	1.594	2.20RX

R denotes an obs. With a large st. resid.

X denotes an obs. Whose X value gives it large influence.

MTB> Goptions;
SUBC> Printer.

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	4	5.679	1.420	0.95	0.467
Error	12	17.851	1.488		
Total	16	23.529			

SOURCE	DF	SEQ SS
NP_1	1	3.490
AA_1	1	2.133
IN1	1	0.020
AT_1	1	0.036

MTB> regression equation is
$Y_1 = 1.75 + 0.262\ NP_1$

Predicator	Coef	Stdev	t-ratio	p
Constant	1.7548	0.5959	2.94	0.006
NP_1	0.26199	0.06836	3.83	0.001

S = 1.353 R – sq = 34.4% R – sq (adj) = 32.1%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	1	26.898	26.898	14.69	0.001
Error	28	51.269	1.831		
Total	29	78.167			

Unusual Observations

Obs.	NP_1	Y	Fit	st.dev.	Fit. Residual	St.Residual
5	11.0	1.000	4.637	0.324	-3.637	-2.77R

R denotes an obs. With a large st. resid.
MTB> paper.

MTB > regression c8 1 c10
The regression equation is
$Y_2 = 6.457 – 0.0926\ AA_2$

Predictor	Coef	Stdev	t-ratio	P
Constant	6.4652	0.8836	7.32	0.000
AA2	-0.09256	0.02967	-3.12	0.004

S = 1.439 R-sq = 25.8% R-sq (adj) = 23.1%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	1	20.163	20.163	9.73	0.0004
Error	28	58.003	2.072		
Total	29	78.167			

Unusual Observation

Obs.	AA_2	Y_1	Fit	S.tdev.	Fit. Residual	St. Resid
6	29.0	8.000	3.781	0.263	4.219	2.98R

R denotes an obs. With a large st. resid.
MTB > regression c8 1 c11
The regression equation is
$Y_1 = 3.90 - 0.000001\ IN_1$

Predictor	Coef	St.dev	t-ratio	P
Constant	3.9018	0.3438	11.35	0.000
IN_2	-0.00000065	0.00000152	-0.43	0.673

S= 1.665 R-sq = 0.6% R-sq (adj) = 0.0%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	1	0.506	0.506	0.18	0.673
Error	28	77.661	2.774		
Total	29	78.167			

Unusual Observations

Obs.	IN_1	Y_1	Fit	Stdev.	Fit. Residual	St. Resid
3	840000	3.000	3.358	1.154	-0.358	-0.30 X
6	120000	8.000	3.824	0.305	4.176	2.55R
10	840140	3.000	3.584	1.155	-0.358	-0.30 X

R denotes an obs. With a large st. resid.
X denotes an obs. Whose X value gives it large influence.
MTB > paper

MTB > regress c8 1 c12
The regression equation is
$Y_1 = 5.87 – 0.0861\ AT_1$

Predictor	Coef	Stdev	t-ratio	P
Constant	5.866	1.204	4.87	0.000
AT1	-0.08611	0.04952	-1.74	0.093

S = 1.587 R-sq = 9.7% R-sq (adj) = 6.5%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	1	7.618	7.618	3.02	0.093
Error	28	70.549	2.520		
Total	29	78.167			

Unusual Observations

Obs.	AT_1	Y_1	Fit	Stdev.	Fit. Residual	St. Residual
6	20.8	8.000	4.075	0.321	3.925	2.53R
7	40.0	1.000	2.422	0.862	-1.422	-1.07X
12	10.0	2.000	5.005	0.734	3.005	-2.13RX

R denotes an obs. With a large st. resid.
X denotes an obs. Whose X value gives it large influence.

Considering Zone 2 which is Moduganari area, the analysis of the result is as follows

MTB > GOptions;
SUBC> Printer.
MTB> regress c1 4 c2 c3 c4 c5
The regression equation is
Y_2= 3.64 + 0.138 NP_2 -0.0482 AA_2 -0.000001 IN_2 + 0.0088 AT_2

Predictor	Coef	Stdev	t-ratio	P
Constant	3.639	1.956	1.86	0.088
NP	0.13843	0.8631	1.60	0.135
AA	-0.04824	0.04634	-1.04	0.318
IN	-0.00000114	0.00000891	-0.13	0.900
AT	0.00877	0.05648	0.16	0.879

S= 1.220 R-sq = 24.1% R-sq (adj) = 0.0%

MTB > regress c1 1 c2
The regression equation is
Y_2= 2.49 + 0.115 NP_2

Predictor	Coef	Stdev	t-ratio	P
Constant	2.4944	0.5687	4.39	0.001
NP_2	0.11521	0.07128	1.62	0.127

S = 1.156 R-sq = 14.8% R-sq (adj) = 9.2%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	1	3.490	3.490	2.61	0.127
Error	15	20.039	1.336		
Total	16	23.529			

Unusual Observations

Obs.	NP	Y	Fit	Stdev.	Fit. Residual	St.Resid
4	17.0	5.000	4.453	0.770	0.547	0.63 X

X denotes an obs. whose X value gives it large influence.

MTB> paper

MTB > regress c1 1 c3
The regression equation is
Y = 4.15 - 0.0286 AA

Predictor	Coef	Stdev	t-ratio	P
Constant	4.153	1.281	3.24	0.005
NP	-0.02858	0.04145	-0.69	0.501

S = 1.233 R-sq = 3.1% R-sq (adj) = 0.0%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	1	0.723	0.723	0.48	0.501
Error	15	22.806	1.520		
Total	16	23.529			

MTB > paper

MTB > regress c1 1 c4
The regression equation is
Y_2= 3.64 - 0.00000 IN

Predictor	Coef	Stdev	t-ratio	P
Constant	3.6403	0.4587	7.94	0.000
NP	-0.00000774	0.00000787	-0.98	0.341

S = 1.214 R-sq = 6.1% R-sq (adj) = 0.0%

Analysis of Variance

SOURCE	DF	SS	MS	F	P
Regression	1	1.427	1.427	0.97	0.341
Error	15	22.102	1.473		
Total	16	23.529			

Unusual Observations

Obs.	NP_2	Y_2	Fit	Stdev	.Fit. Residual	St.Resid
11	16.7000	2.000	2.347	1.007	-0.347	-0.51 X

X denotes an obs. Whose X value gives it large influence.
MTB> paper.

Table 1 Vehicular trip (state low cost) abbaganaram household interview Questionaire data

S/No	No of person in household	No of person trip	Average age(yrs)	Destination	Age	Relative income of household per anum	Time of travel	Purpose of journey	Car ownership	Average time
1.	10	5	19	p. office (3) BSMC	25 20 22 15 43	N39,610 (5 EMP)	30 min 30 min 10 min 10 min	Work school	Nil	22.0
2.	11	6	17	Warlord	40 14 13 12 10	N21,800	50 min 15 min 10 min	Work school	1	18.3
3.	13	3	17	Bama road (2) konduga .	15 15 17	N84,000 (3EMP)	30 min 30 min 20 min	School	1	26.7
4.	6	4	24	Kwashe (2) M. market (2)	38 29 23 6	N150,000 (2 EMP)	30 min 30 min 25 min 25 min	Work shop school	1	27.5
5.	11	1	37	Unimid	37	N50,000	30 min	Works	1	30.0
6.	16	8	29	P. office (3) M. market (4) Mass L.G.A	67 10 19 22 25 29	N120,000	30 min 30 min 10 min 25 min 30 min 30 min	Per.Bus school	Nil	20.8
7.	5	1	42	Damaturu road	42	N50,000	40 min	Works	NIL	40
8.	8	2	47	M. market baga road	46 47	N18,000	30 min 25 min	Shop	Nil	27.5

Table 1 cont. Vehicular trip (state low cost) abbaganaram household interview Questionaire data

S/NO	No of person in household	No of person trip	Average age(yrs)	Destination	Age	Relative income of household Per Month	Time of travel	Purpose of journey	Car ownership	Average time
9.	10	5	23	Bama. road Rm.poly (4)	38 25 18 22 12	N37,000 (2 EMP)	35 min 35 min 35 min 35 min 35 min	Works school school school school	1	31.0
10.	3	3	36	P. office	51 28 29	N84,140 (3 EMP)	25 min 25 min 25 min	Works works works	Nil	25.0
11.	5	2	39	Wulari P. office	40 37	N18,960	15 min 30 min	Works	Nil	22.5
12.	2	2	40	Shehu Pal. (2)	42 37	N6,000 (2 EMP)	10 min	Works	Nil	10.0
13.	15	5	22	Govt. house P.office (2) Bama road (2)	45 28 13 11	N120,000 (2 EMP)	30 min 25 min 25 min 30 min	Works school	1	22.0
14.	12	5	22	Govt. house (2) P. office (2)	43 24 12	N84,000 (2 EMP)	30 min 25 min	Works school	1	27.0

					7					
15.	5	2	30	Custom (1) P. office	19 40	N30,000	10 min 30 min	Works	1	20.0
16.	8	2	17	El-kanem	43 14 12 9 7	N30,000	15 min	Work school	Nil	15.0

Table 1 cont. Vehicular trip (state low cost) abbaganaram household interview questionaire data

S/NO	No of person in household	No of person trip	Average age(yrs)	Destination	Age	Relative income of household Per Month	Time of travel	Purpose of journey	Car ownership	Average time
17.	10	4	19	Abba Gana (3) market	36 12 10 16	N12,660	15 min 15 min 15 min 30 min	School works school shop	1	18.8
18.	8	5	29	Bama road (2) Damb.Rd.(2) Bagg Rd ((1)	43 33 35 25 20	N50,000 (4 emp)	30 min 30 min 20 min	Works works school	1	26.0
19.	2	1	36	Bama road	36	N12,000	25 min	Works l	Nil	25
20.	12	4	27	Bama Rd (3) P. office	41 28 9 11	N39,000 (2 emp)	25 min 20 min	Works schools	1	17.5
21.	7	5	21	Custom FGC MA T.H. FGC Custom	38 30 15 13 9	22,022	10 min 25 min 20 min	Works school Work	Nil	13.0
22.	10	5	28	Custom (2) P.off Mafoni Shehu Place MA,T.H	49 18 20 19 35	N15,000	10 min 29 min 15 min 10 min 25 min	Works	1	17.0
23.	7	5	20	P. office FGC FGC GRA GRA	21 18 15 41 6	N17,735	25 min 25 min 25 min 25 min	School school works school	Nil	25.0
24.	3	3	30	M market moduganari P. office	45 28 17	N56,160 (2 emp)	20 min 30 min 25 min	Shop socialRec. pers. Bus	Nil	25.0

Table 1 cont. Vehicular trip (state low cost) abbaganaram household interview Questionaire data

S/No	No of person in household	No of person trip	Average age(yrs)	Destination	Age	Relative income of household Per Month	Time of travel	Purpose of journey	Car ownership	Average time
25	6	5	22	Ram poly (2 Bama road(2) GRA	20 28 21 24 28	N18,000	25 min 25 min 25 min	School	Nil	24.0
26	4	4	21	P. office	38	N60,000	25 min	School	Nil	25.0

				GRA market(2)	22 6 19		20 min 25 min 30 min	shop		
27	10	5	23	M. market Baga road Bama road(3)	24 35 30 11 13	N180,000 (4 EMP)	25 min 20 min 25 min 30 min	Shop works school school	1	25.0
28	6	3	22	Damat.road Ram. Poly Uninaid	35 25 6	N72,000 (2 EMP)	30 min 25 min 30 min	Works school school	1	28.3
29	6	4	20	Fed Sec. El-kanemi Coll. Shehu Gar.	28 28 8 5	N42,096 (2 EMP)	30 min 30 min 30 min 30 min	Works school	1	30.0
30	7	3	34	State Sec. Ramat (2)	32 27 15	N42,096	20 min 25 min 25 min	Works school school	Nil	23.3
	Total=.238	Total=115								

Table 2. Vehicular trip moduganari household interview questionaire data

S/No	No of person in household	No of person trip	Average age(yrs)	Destination	Age	Relative income of household Per Month	Time of travel	Purpose of journey	Car ownership	Average time
1.	7	4	40	M. market. Ahmadu B. “ Monday M.	62 26 32	N34,000	20 min 10 min 10 min 20 min	Shop school per Bus “	Nil	15
2.	14	3	41	M. market “ “	50 35 37	N15,000	20 min “ “	Shop “	Nil	20
3.	10	5	27	Bama R. TH Bocolis Gvt. Cool Market “	41 28 17 15 35	N25,000	40 min 15 min 10 min 20 min “	Works	Nil	21
4.	17	5	34	Pri H. Q. FGC market “ “ “	45 15 14 47 47	N60,000	40 min 25 min 25 min 20 min	Works school “ Shop “	Nil	26
5.	6	5	23	Unimaid umarari Baga Rd (3)	41 33 16 14 12	N28,080 (2 EMP)	35 min 40 min 30 min “ “	School works per Bus other	Nil	33
6.	7	3	33	Jajeri Market. “	27 22 50	N34,000	35 min 25 min “	Per. Bus shop “	Nil	26.3
7.	8	5	22	State Sec. L. (state) Ram. Poly Pri. A. Bello	34 29 22 14	N14,156 (2 employ)	15 min 15 min 10 min “	Works “ School “	Nil	12.5
8.	4	4	23	Baga R. Pri.	40	N10,000	30 min	Work	Nil	23.7

				P. office “ Gwage R.	28 12 10		15 min “ 25 min	school “ shop		

Table 2 cont. Vehicular trip moduganari household interview questionaire data

S/No	No of person in household	No of person trip	Average age(yrs)	Destination	Age	Relative income of household Per Month	Time of travel	Purpose of journey	Car ownership	Average time
9.	7	2	16	Custom custom	27 11 9	N34,800	25 min “	Works Works	Nil	25
10.	10	12	14	central B.P office	43	N35,000	20 min 12 min	Works Works	Nil	17.5
11.	2	2	31	Baga R. P. office	35 27	N167,000 (2 EMP)	25 min 15 min	Works Works shop school	Nil	30
12.	6	3	42	Abba GRA “ “	32 28 65	N80,800	25 min “ “	School works	Nil	25
13.	4	2	30	Ramat poly K/Kasama	37 32	N50,000 (2 EMP)	10 min 20 min	Works school	Nil	15
14.	3	4	22	State Sec. L. state FGC	6 28 32	N31,200 (2 EMP)	15 min “ 30 min	Works school “ School “	Nil	20
15.	4	4	27	T. Hosp. M market university	4 30 19 17	N84,440	25 min 20 min 30 min 20 min	Works works school School	Nil	23.8
16.	2	2	31	University Baga Road	27 34	N50,000	30 min 30 min	School work	Nil	30
17	7	2	29	custom market	27	N7,000	25 min 20 min	WORK	N11	22.5
	Total=117	Total=.56								

Conclusion/ Recommendation

The trip vehicular modeling which had been carried out in Maiduguri metropolis to study the trip making had been moderately achieved. This is due to fact that during the process of collecting data some of the information is bias. Sometimes the respondent would not give the exact amount of the income. These seriously affect the result, similarly the time of departure is just an approximated value by the respondent, because he is not assessing to time. Sometimes you may come across a particular

House where by the number of people present is high, but the trip making is law. In some instance, a house with high income but have tender the trip generated in that house. In computing an average value was considered and this will also affect the trip generated. For instance the time taking for person trip is taking has an average value in order to input the data in computer. The income is the total amount of

all the workers in that particular house which is input in the computer as the variable dependent of the trip. With all this reasons together with problem of fuel scarcity affect the result obtained by the regression. In state low cost the regression is $\mathbf{Y_1 = 5.34 + 0.237NP_1 – 0.0741\ AA_1 – 0.000001\ IN_1 – 0.0504\ AT_1}$ and the regression square is 58.3% that is to say the relationship is just a little high than the average. The second equation in the second zone is $\mathbf{Y_2 = 3.64 + 0.138\ NP_2 -0.0482\ AA_2 -0.000001\ IN_2 + 0.0088\ AT_2}$. The regression square is 24.1% which mean that the relationship is very low.

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