Determinants of Individual Travel Expenditure: Issues on Transportation Development in Nigeria

Ojinma, C. C[1]. And Nlem, P. C.[2]

Department of Geography Alvan Ikoku Federal College of Education, Owerri, Nigeria

Abstract: *Transportation as in other developmental sectors has generally proceeded on a haphazard and at best sectoral planning activities. Since transportation is the link between places, areas, and individuals. Development, if it is about people and places, certainly needs a proper understanding of transportation and its determinants or the variables that control readiness of individuals to travel. It is in this view that this paper attempted to determine these variables through a field survey and analyses. Our finding revealed that income, occupation, Age, Education and No. of children are the variables that control individual willingness to spend for travelling and the proportion of such income that can be so budgeted. The implication is that policies and plans that affect these variables, will influence transportation development in Nigeria.*

Keywords*: Determinants, Transport: budget, and Expenditures*

I. Introduction

If development is about people, there is no doubt that the well-being of any group of people becomes paramount in any developmental consideration. Such a concept of development, of necessity, implies that investment should be on the right things and such things must be put in the right places. However, whether things are put in the right places or not and investments are made on the right things or not, it appears that the role of transport in stimulating and distributing both people and growth impulses in a regional or inter-national context cannot be over-emphasised. When things are not in the right places, people pay more to derive their benefits than when they are at the right places. The fact that they must pay to attend to their needs is only part of the well-being (development). It does appear that transportation, which has been defined as a measure of the relations and connections between areas and things is a corollary of any developmental consideration (Adams and Helleiner, 1972:2).

In terms of material development, Luggard (1922) aptly summarized that of tropical Africa as consisting of transportation (see also Uyanga, 1980). What these people mean is that through transportation infrastructures, "primitive" areas are opened up and the standard of living of the people is improved through the transference of their products to best markets outside their region of habitation. Such opening up of areas and transference of goods, do also create innovation routes and liberate the economy of the people to interact with outside forces (sometimes stronger than the internal forces) thereby establishing change and material investments.

One snag about the ability of transportation, especially land transportation to achieve these is the level of efficiency and satisfaction that the users enjoy from the system. Efficiency and satisfaction are two important components of transportation that enhance National Development. These imply among other things, the ability to economically and conveniently organize the system to provide the needed services undetrimental to the well-being of the users.

In Nigeria today, the transportation system has been so arranged that the costs of transfer of goods and passengers have become prohibitive. This is especially worrying because it does not appear that such costs are commensurate with the level of service – efficiency and satisfaction that the facility operators provide. Whereas the governments (both federal and states) have continued to invest resources and allocate funds… to the transport sector, the prohibitive costs of operation and maintenance have continued to keep the using cost of the transportation facilities above the adequate expenditure level of many of the users whether in the urban, rural, intracity or inter-state routes. For instance the federal government declared in 2011 that the billions (Naira) subsidy withdrawn from petroleum products will partly be channeled into the provision of the urban mass transit schemes in the federal and state levels. Despite this, transportation costs have between 2011 and 2013 increased about 200% both within the urban areas and for long-distance travels (Ojinma, 2012).

Despite these fare (aviation and land transport) hikes, individuals have continued to use these facilities. There is no doubt, that the well-being of most people are affected for the worse. Hence National development suffers.

What are those factors that we can continue to manipulate to make the users keep using the system and which if we neglect, the transport sector might collapse and with it, the vital role of transportation in National development. These and other issues are the considerations of this paper.

The next section puts forward the data for this study. After the data, the expenditure models and implications for transportation development.

II.   Data Collection

The data for this work was collected in the month of August, 2012, with Imo and Abia States as our focus. The field survey among other things collected data on the provisions, use and perception of transport infrastructures and even transportation problems.

These states like any other area of the federation of Nigeria started enjoying modern road building around 1900, when the existing bush paths were developed into motorable roads (Filani, 1981). However, the era of spatial change actually started around 1976. This period corresponds especially between 1978 and 1983, (see Oguamalam, 1984; Enwerem, 1985). By 2003, Imo and Abia states have been criss-crossed by about 2000km of roads: 250km of Federal Expressway; 1,000km of Federal Trunk roads and 750km state roads. These roads consist of 76% two-lane roads. Apart from the 250km expressway, there are about 8.2km of four-lane roads, 46% being asphalt roads, 44% with surface treatment and 10% of laterite roads. Despite these network of primary roads, rural to rural graded and enlarged roads with culverts and bridgeheads have by 2010 been extended to include a total length of 3,500km (Tell Mag. 2011). The states' road network carries a total of about 110million tons of freight and 560million passengers annually [Imo State Atlas 1979 (modified)]. The study area is crossed approximately from North to South by the Port-Harcourt-Enugu-Makurdi railway line. There are no sea ports but an airport exists at Owerri. Services from these facilities are supported from the neighbouring Rivers, cross-River, Anambra and AkwaIbom States.

Fourteen settlements are covered in the study. Seven of these are urban centres while the remaining are rural settlements spatially distributed throughout the two states. A deliberate attempt was made to include samples from the various senatorial zones of the states. Moreover the equal number of the settlements in the urban and rural areas was included to meaningfully enhance comparison and the need to reduce the sample size to a manageable level. The sample size of each location is partly based on the relative size of each centre and partly on a proportional sampling formular of 0.15% of the population for Aba urban; 0.20% for other urban areas and 1% for the rural settlements. The number of respondents chosen varied between 12 for the smallest settlement of Agwa (Ohaji L.G.A (Imo State) to 339 for Aba urban (Abia state). On the whole 991 questionnaires were analysed. Various information were sought by the survey but for the purpose of this work responses on individual socio-economic characteristics such as age, income, educational attainment, occupation, number of children and the problems of transportation in the states will be highlighted.

The age of the respondents range between seventeen and eighty years, with a mean of thirty-six and a mode of twenty-years. Fifty-eight percent of the sample is male, while forty percent of the respondents are single, only about four percent are widows. Whereas eight percent of these respondents have no formal education, the mean of years spent at school is nine with a mode of eleven years and standard deviation of five. About forty-three percent of the sample is made up of self-employed people.

III.   Expenditure Model of Individual Travel

In general analysis of travel expenditure of individuals have considered various variables. Most of the works have often used such variables in a spatial context. In such analysis city size, population size, population densities, even the degree of distance friction – accessibility to facilities, type of road links, etc have been used. One fact of these analyses is that though significant relations have been found, the quantity of variations explained by such variables are usually limited. These same observations are made when travel behavior variables are used for these analyses. Generally, such travel behavior variables as number of places visited; number of times travelled; type of vehicles used etc. do create problems of multicolinearity, as both the spatial variables and the socio-economic variables find expressions through such behavioural variables. Most often attempt to solve this problem has been through the use of factorial approach to eliminate some less important socio-economic and spatial variables and identify the dominant ones.

We must not forget however, especially in terms of socio-economic variables that behaviours are dynamic, often responding to the changing situations of individuals. Hence it is important to notice some of those non-dominant but tangible aspects of individuals possessions and qualities that can generally influence other aspects of such an individual's life. It is in this consideration that the present work focuses on the socio-economic variables of individuals to determine the travel expenditure controls especially in terms of proportion of the individuals budget that is spent for transportation.

The socio-economic characteristics included as the independent variables are the age of individual (X_1); sex (X_2): Marital Status (X_3); educational status (measured in number of years of formal schooling (X_4);

Occupation (X5); Income (X6); number of children (X7); Household size (X8); Car Ownership (number of cars owned) (X9); while the dependent variable is YA – the proportion of income expended on travel by individuals.

In this analysis, variables X2; X3 and X5 are considered as dummy variables. All the other variables maintain positive relationships except, variables X1; X7 and X8 that have negative relationships. The next section develops a Multiple Regression and Correlation Model of travel monetary expenditure.

IV. The Multiple Regression and Correlation Model

This Model may be given thus:

$YA = b_o - b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 - b_7x_7 - b_8x_8 + b_9x_9 + E,$ (1)

Where:

YA	=	proportion of revenue spent on travel
b_o	=	base constant
$b_1 - b_9$	=	regression coefficients
$x_1 - x_9$	=	socio-economic variables
E	=	Stochatic disturbance term (error margin)

An assumption is made as to the inability of all the variables to significantly contribute to the explanation, hence the stepwise forward inclusion variant is adopted. The procedure terminated in the fifth step and variables were included in the following order: Education (x_4); Age (x_1); occupation (x_5); income (x_6) and number of children (x_7). Table 4 provides a test for significance of the reduces model.

Table 1: Analysis of Variables of the Reduced Model

Source of Variation	Sum of Squares	Degrees of Freedom (DF)	Mean -Squares	F-Ratio	R2
Regression residual	27282.59 277297.73	5 986	5456.52 281.24	19.40(+)	0.0895
Total	**304580.32**	**991**	**5737.76**		

(+) Significant at 0.05 percent level.

The level of importance of each of the five variables and their individual contributions to the overall explanatory power are tested on table 5.

Table 2: Test of Significance of the Five Variables

Step	Variables	R2 Change	R2	B	Standard Error of B	F - Ratio
1	Education	0.03889	0.03889	-.93245	0.14732	40.062++
2	Age	0.01667	0.05556	-.22115	0.05293	29.092++
3	Occupation	0.01691	0.07247	1.65807	0.39066	25.733+
4	Income	0.01108	0.08355	-5.2415E-04	1.51784E-04	22.494+
5	No. of children	0.00602	0.08957	0.88448	0.34618	19.40++

(+)   -   Significant at 0.025 level
(++)   -   Significant at 0.05 level

Table 1 indicates that the proportion of money individuals will budget for travelling in any one month will vary from one person to another, depending on the education, age, occupation, income and number of children of the traveller. Following from the type of relationships that can be represented by the equation of line of best fit thus:

$YA = b_o - b_4x_4 - b_1x_1 + b_5x_5 - b_6x_6 + b_7x_7$ (2)

This means that the proportion of income to be budgeted for travelling expenditure will be high if the traveler has not spent many number of years in formal education, is young, has highly valued but not highly paid jobs but has a family. This finding shows that travellers ages, education and income have negative relationship with the proportion of income spent on travel, while occupational status and number of children are directly related to such budget.

Table 2 reveals however, that occupation and income are more significant in controlling such budgets of travelers than education, age and number of children. Whereas education accounts more for the individual variation, number of children does not make too much difference between one person's travel expenditure and another. Income and occupation are also less important in this regard.

V. Implication for Transport Development

The findings of our empirical analysis holds certain interesting results for transport development in Nigeria. Especially from the users' perspective. In our earlier attempts at understanding the travel activity of "Imo Citizens" (Ojinma, 1989). We did indicate that most travelers use either taxicabs or buses. The reason for such choice being what is available and probably "cheaper" (considering also speed and convenience). Despite

these adjustments, we discovered that travelers in the rural areas spend more than 50% of their monthly incomes to travel. This is especially disturbing because the rural travelers generally receive lower incomes than their urban counterparts. It is in this realization that our findings from table 1 and 2 make meaning. To ensure that such large parts of the incomes are not directed towards travelling in these days of severe and global economic adjustments, there is need to structurally adjust these identified characteristics of individual travelers. This type of adjustment will help sustain the transport sector and indeed develop it. What we are proposing is that, it is time planners begin to see the close relationship between the transportation sector and the quality of individual users of the system. It is obvious that in today's Nigeria, inflationary tendencies are high, and, when individual travelers, especially those in the rural areas, with less incomes, budget so much from transportation, there will not be enough remaining to keep body and soul together. In this sense, the proposed free and adult education programmes of Imo State and the Federal Governments should be vigorously pursued to increase the level of education of the presently dominantly illiterate travelers. This attempt, will not only increase the quality of jobs engaged in by these people; but will also improve the level of incomes of the travelers.

Again, one has to commend the good works of the Federal Road Safety Corp, who insists on making the drivers on Nigerian Roads sane. This is with a view to reducing accidents. The implication of this to our finding is that since younger people and those who especially have large families are mostly involved in travels, a reduction or in the event, elimination of drastic road accidents will save the young people of Nigeria from premature deaths and enhance the longevity of those with large families.

Moreover, it is hoped that if the level of illiteracy is reduced and workers earn large incomes, more people will be travelling, thereby ensuring the sustenance of the transportation sector and, that the transport operators do break even. Such a situation, it is hoped will increase the overall development of the transportation sector in particular and Nigeria in general.

VI.   Conclusion

Although this study deals with about two states at present, its findings are very relevant to transportation development in Nigeria as a whole, especially if consideration of development focuses on well-being and from the transport users perspective. Its findings should interest both transportation and infrastructural planners and investors. One area that is of necessity is the realization of the significant relations between the education of transport users and the amount of money these users budget for transportation, as a proportion of their total earnings. This kind of relationship and others revealed in their paper should make planners more responsive to wholistic rather than the present piece-meal strategy being adopted in planning the different sectors of the Nigeria economy.

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