

SOME FACTORS EXPLAINING TOTAL DAILY INCOME OF PUBLIC TRANSPORT MOTORCYCLE OPERATORS IN AKURE, NIGERIA

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Abstract

Following the introduction of Structural Adjustment Programme (SAP) to Nigeria, a new mode of public transport locally called *Okada* emerged. *Okadas* are commercial motorcycles that continue to gain wide acceptance across Nigeria. Any planning improvement prescription that does not take into consideration the factors that explain the total daily income accruable to operators will fail. This paper presents empirical estimates (Regression elasticities) of some factors that explain the total daily income of commercial motorcycle operators in Akure, Nigeria. Estimates show that the factors that significantly explain total income of operators are; the relationship that exists between fleet owners and operators; the repair (maintenance) skill of operators; daily costs of operators; and the possibility of a ban by government. Some policy implications of the research findings are discussed.

Introduction

Public transport in many Third World cities is mainly road-based, consisting of an array of modes ranging from human footage, to the use of municipal buses (Armstrong Wright 1987, Jacobs 1989). In most developing countries, public transport is made up mainly of medium-sized vehicles (paratransit) that emerged under peculiar circumstances and are sustained according to local needs (Lee, 1989; Meakin, 1989; Adesanya, 1998). For Kenya, according to Yearsley (1989), the Matatus (minibuses) were legalized in 1973 as a result of the International Labour Organisation (ILO) report on unemployment.

Within the paratransit arm, motorcycles have begun to play an important role in many cities. In Jakarta, the motorcycle mode accounted for about 20% of the 6.8million public daily trips (Mogridge, 1989). A very recent report showed that 16.0% and 5.2% of work trips in Ludchow (India) and Lagos are made by public motorcycles (Auclair, 1999). The role played by commercial motorcycles will become more significant in the years to come because of increasing urbanization, escalating public transport demand, uncontrolled urban sprawl, diminishing importance of slate controlled bus operations, among other factors (Jacobs, 1980, 1982, 1989; Fasakin, 1990 and 1996).

The recent emergence and growth of the use of motorcycles for public transport in Nigeria, are conditioned by her huge population with its rapid rate of annual growth and national economic mismanagement. With a modest population of 18.7 million in 1921, the country's population ballooned to 88.5million in 1991 (World Bank, 1995; Yakoob, 1997). The urban population has been put at 20% in 1970, 23% in 1984 (UN, 1984), 38% in 1991 (Onibokun 1992), 40% in 1996 (Alausa, 1997), and 60% by 2010 (World Bank, 1995). At an annual growth rate of 5.3%, the urban population will double in 2010 (Yacoob, 1997).

Economic problems and mismanagement began when crude petroleum prices collapsed in the world market in 1981 (Falegan, 1986; Falae 1998; Giwa, 1992). Between 1980 and 1992, crude oil earnings dropped from \$22 billion to \$14 billion. The combined effect of huge, increasing population and economic decline is the gradual disappearance of public transport buses in most Nigerian cities. In Lagos, the population dropped from 20,000 in 1993 to 10,000 in 1992 (Bolade, 1993); Nigerians responded to this situation spontaneously by evolving various forms of public transport modes some of which are less desirable.

One mode that continues to grow and gain national prominence is the commercial **motorcycle** (Akande, 1987; Akanbi, 1998; Fasakin, 1990; Ogunsakin and Galtima, 1993; Layode, 1998; Adesanya, 1998). Some studies have documented the characteristics of this mode in many cities, nevertheless, none has researched into the total daily income of operators of public motorcycles in Nigerian cities. It is the contention of this author, that the long term sustainability of commercial motorcycles can only be guaranteed, if the total daily income of operators are enhanced.

It is the purpose of this paper, therefore, to examine some factors that explain total daily income operators of commercial motorcycles in Akure. It aims at presenting empirical estimates (regression elasticities) to specify the impact of these factors on total daily income of operators.

Research Methodology

This investigation was carried out in Akure, Nigeria. Akure is a medium-sized city of about 191 (1991 census) located approximately 350 kilometres North-East of Lagos. At present, it is the political capital of Ondo State of Nigeria.

Data for analysis were collected using the questionnaire. The survey was conducted between 1998 and January 1999. The questionnaires were administered by trained field assistants. Field reports show that even with this direct approach to data collection, delays in retrieval of questionnaires were experienced because of the very mobile nature of *Okada* operators - as many operate on free-range basis. Also many not too literate, hence assistants had to interpret from the English, the medium of survey - to Yoruba, in; language.

The respondents (the operators) were selected from a register of *Okadas* whose number as at mid 1998 stood at 975, all registered in twenty (20) termini all over the city. Ten (10) out of 20 termini selected by simple random sampling, while the disproportionate sampling technique was applied to choose 30 operators in

the 10 termini surveyed. This technique was used as each of the termini recorded variations IT register from time to time because of the free-range operations carried out by some operators. At the ea^ the survey, 225 out of the total 300 questionnaires administered were found to be usable.

Data analysis was carried out using the logic linear regression model. The specification, definition justification for the selection of the explanatory variables in the model are given in Table 1. Altogether-variables were investigated out of which 12 were used for the analysis (Appendix

Tablet. Definition And Summary Statistics Of Total Daily Income Variables

Variable Code	Definition of Variables	Measurement Scale	Mean	STD ±
Dependent Variables D-Income	Daily Income of Operations	1=N1002=N100-N200 3=N200-N400 4=N400-N600	300.00	77.00
Independent Variables GACOST	Garaging Cost or Costs of using <i>Okada</i> Termini (Naira)	1=N5.002=N5-N10 3=N10-N204=N20	10.02	3.995
TOTRIPS	Total Daily Trips	1=<10 2=10-20 3=20-30 4=30-40 5=>40	30.58	15.470
SPASO	Source of Spare Parts	1=Akure 2=Oshogbo 3=Benin 4=Ibadan 5=Lagos	1.222	0.815
WEHAZ	Hazardous weather Elements	1=Sun 2=Rain 3=Cold 4-Rushing wind	2.111	0.819
OTHERBIZ	Other Business Owned by Operates	1=Yes 2=No	1.489	0.544
ATBAN	Attitude Towards a Government Ban on Operations	1 -Will protest 2=will find other jobs 3=will go to former jobs	1.724	0.858
FRACCI	Frequency or Number of Accident Yearly	1 =m None 2=one 3=two 4=more than two		
EXPI	Riding Experience prior to Operators	1=< Iyr 2=1-2yrs 3-2-5yrs 4= > 4yrs	1.138	0.457

-	(districts) of regular operations			
RELATIONSHIP	Relationship between owners and operators	1=V. Cordial 2=Cordial 3=Bad 4=V. Bad	1.387	0.564
RESKILL	Repair skills of operators	1=High degree 2=less degree 3=no skill	1.502	0.786
DOPOSTS	Daily operational costs. (Naira)	1=N502=N50-N100 3=N100-N2004-N >N200	216.86	63.400
AGE	Age of Okada Machines (Years)	1=<1yr2=1-5yrs 3=5yrs 4=>10yrs	5.60	2.657
REASONS	Reasons for operating <i>Okada</i> business	1=Earn living 2=supplement living 3=pay hire purchase	1.369	0.892
OKPRO	Operational problems of <i>Okadas</i>	1=police 2=bad weather 3=bad road"" 4=accident 5=sickness	3.613	1.249
UNION	Assessment of Union activities	1 ^Collection of money 2=Help members 3=Facilitate operations	1.711	0.955
D-PROFIT	Daily profit (Naira)	1=N1002=N100-N200 3=N200-N400 4-N400-N600 5-N600-N1000 6>N1000	372.80	121.06

NOTE: + Naira is the local currency 100 Naira = 1 U.S Dollar at 1999 prices. **Source:** *Author's Fieldwork 1999*

Specification, Definition and Justification of Research Variables

As a basis for the empirical analysis, the specification, definition and justification for the choice of variables are discussed. The variable of fundamental interest in the analysis is the choice D-INCOME defined as the daily income of operators. The other variables are a row vector of transit, personal, environmental, land, attitudinal attributes.

The transit variables are TOTRIPS, FRACCI, AREGU, DOPCOSTS OKPRO, and DPROFIT. These variables are considered as the key attributes that define, shapen and sustain activities of the *Okadas*. TOTRIPS is considered essential to the derivation of total daily income. All things being equal, a high frequency of accidents either requires the ploughing back of daily income in order to continue operations or causes delays in hours of operation.

AREGU reveals the nature of districts of operation. In recent times, commercial motorcycles have infiltrated the commercial core and the administrative suburbs of the city from the initial dominant residential areas. DOPCOSTS is a measure that strictly shows what an operator incurs as expenses daily. A low daily operational cost will translate to high total daily income. As a nascent public transport mode, *Okadas* are beset with a number of operational problems (OKPRO). Two important problems are; the multiple levies imposed by unions and local government officials on operators and gratifications given to Police so as to escape arrests or pay fines due to traffic infringements. These two factors have proved to be very significant in determining D-INCOME (Fasakin, 2000). Needless to say that a direct relationship is expected between the levels of profit (DPROFITS) of operators and D-INCOME.

The personal attributes are AGE, REASONS, RESKILL, RELATIONSHIP and OTHER. Other surveys and reports have shown that operators are mainly jobless youths (AGE) who embrace

okada activities (REASONS) to alleviate poverty (Kuyoro, 1997; Layode, 1998 and Adesanya, 1998 Repair skills (RESKILLS) are considered crucial to sustainable operations or to minimizing disruptions in operation. Some operators are civil servants and artisans who operate on a part-time basis (OTHERBTZ). For part-time operators, D-INCOME is expected to be lower compared to those of full-time operators. EXPI is a variable included to assess the relationship between the level experience of operators prior to the commencement of operations and daily income. EXPI is equally valuable to machine maintenance, avoidance of accidents and sometimes route familiarity.

The environmental variables of analysis are WEHAZ and SPASO. WEHAZ is quite relevant because operators use machines in their natural and unadapted forms unlike the three-wheeled autorickshaws of India. Consequently, operations are affected by the elements of weather like rain, cold, etc. The sources of spare parts (SPASO) also contributed to the ease of machine maintenance through ready access, thereby reducing the costs of daily operations which in turn increases daily income.

The attitudinal attributes are ATBAN, UNION and RELATIONSHIP. The current clamour in Lagos for a ban on *okada* activities nationwide informs the inclusion of ATBAN.

Table 2: Estimated Multiple Regression Model for Daily Income Variables

Variable	Regression Coefficient	Absolute t-value	significance of t-values	Implicit Daily ^a Income (Naira)
In GACOST	0.066	-0.569	0.570	19.80
In TOTRIPS	0.166	1.790	0.074	49.80
In SPASO	0.044	0.803	0.423	13.20
In WEHAZ	-0.009	-1.056	0.292	-2.70
In OTHERBIZ	-0.216	-2.069	0.039*	-64.80
In ATBAN	0.070	2.000	0.046*	23.00
In FRACCI	0.005	1.118	0.265	1.80
In EXPI	-0.105	-1.583	0.115	-31.50
In AREGU	0.035	0.286	0.775	10.50 *
In RELATIONSHIP	0.622	11.272	0.0000**	186.60
In RESKILL	0.124	2.396	0.017*	37.20
In DOPCOSTS	0.102	2.271	0.024*	30.60
In AGE	-0.069	-1.327	0.186	-20.70
In REASONS	-0.104	-1.786	0.075	-31.20
In OKPRO	0.039	-0.727	0.468	-11.70
In UNION	0.033	0.598	0.468	9.90
In DPROFIT	0.010	0.182	0.856	3.00
Constant	0.198	0.436	0.6629	-
R ²			0.705	
F-ratio			12.038+++	
Significance of F-ratio			0.000	
N			544	

NOTE: Naira is the local currency. 140 Naira = 1 U.S dollar at 2001 exchange rate. A = Implicit Daily Income is calculated on based average of N300.00. • Significant at 0,05 level. * * Significant at 0.01 level.

It measures the disposition of operators to the possibility of a ban on their activities by the government. UNION is another variable, which sometimes defines regularity and nature of operations. Many operators engage in free-range operations to sidetrack the exploitative dispositions of *okada* union officials, while the frequency of trips is to some extent, dependent on the activities of union officials in the termini. RELATIONSHIP is a socio-cultural attribute that roundly shapes operators attitude to operations. In Nigeria, operations are known to cease on the basis of disagreement between owners of business and hired operators.

Empirical Estimation and Discussion of Result

The model used in the empirical estimation of parameters of analysis is the logic linear regression function which states that; the variations in the daily income of operators can be accounted for by: the garaging costs; the total daily trips, source of spare parts; weather hazards; other business, etc. The elasticity of daily income with respect to the variable earlier defined can be obtained directly, if an additive specification of the variables is utilized such that:

$$\ln(D\text{-INCOME}) = b_0 + b_1 \ln(GACOST) + B_2 \ln(TOTRIPS) + b_3 \ln(SPASO) + b_4 \ln(DPROFIT) \dots \dots \dots (1)$$

Where \ln is natural logarithm, b_1, \dots, B_7 are the elasticity estimates of the variables specified, measured on a continuous scale. Such a model in equation I above is known as constant elasticity model whereby the relative effect of a change in any of the independent variable is constant and equal to the regression coefficient (Arimah, 1995, 1997, Camning 1998).

The rationale for employing logit regression model is two-fold. One, it enables us to present the regression coefficients directly as elasticity estimates. Two, it reduces the occurrence of heteroscedasticity, thereby ensuring the efficiency of the parameter estimates.

The matrix of intercorrelation among variables used in the analysis indicates that the regression results are not affected by multicollinearity because, all pair-wise correlation coefficients are under 0.80 (Hauser, 1974). A further indication of the absence of multicollinearity can be seen in the stability of the regression coefficients - in that their signs conform to apriori expectations.

From Table 2, the most important factor that significantly impacts on daily income is the cordiality or otherwise of the relationship that exist between operators and their masters (RELATIONSHIP). With a coefficient estimate of 0.622, it means that, if the relationship between the owners of business and the operators improves by 100%, daily income will correspondingly increase by 62.2% or \$4186.60 per day. This is an important discovery and it accords with apriori expectation. Improved relationship could take the form of owners of fleet allowing operators more freedom to operate in a flexible way by extending hours of operation, reducing delivery charges, etc. An improved relationship between the two parties will go a long way to improve and sustain *okada* operations to the mutual benefits of both.

The second most significant factor influencing daily income is the repair skill of operators with a parameter estimate of 0.124. This implies that an improvement of the repair skills of operators by 10% will surely induce 1.2% daily increases in income. Translated into implicit Naira income, operators will realize N37.20 more everyday as daily income, if they acquire more skills, perhaps through workshop training or part-time apprenticeship. At present, most operators can replace weak engine plugs, tighten some bolts, fix batteries and punctured tyres. They can further be trained to acquire more sophisticated mechanical skills such as servicing machines, repairing damaged engines.

DOPCOSTS is the next factor that impacts significantly on daily income. It has a parameter estimate of 0.102, which is significant at 0.05 level and beyond. With this estimate, it means that a 100% increase in daily costs will bring less than proportionate increase of 10.2% or 1430.60 increase in daily income. This result further points to the fact that running costs should not be allowed to go up, because it will reduce the daily income of operators. As plausible as this outcome appears to be, it calls for serious policy intervention to keep daily operational costs at low levels at all times. At present, operators are operating at a relatively low costs compared to profits, as low as 1/3 of daily profits (Fasakm, 1999). It is this regime of low operational costs that induces the youths to take to commercial motorcycle activities in recent times.

Another factor that influences daily income, is the possession of multiple businesses or alternative enterprises by some operators. OTHERBIZ has a parameter estimate of -0.216, which means that, should operators double the time they presently devote to other businesses, the level of daily income will decrease by 21.6% or N64.80 daily. This again is a very plausible outcome, which is detrimental to sustainable operations by the *Okadas*. It has been established that most operators are automobile mechanics who veer to *okada* activities to supplement their income. Moreover, some are also civil servants who operate on part-time basis after office hours (Fasakin, 1999). The conclusion here is that, although the profit levels realized by operators are high, they are not high enough to dissuade them from engaging in other business. It also means that *okada* activities are thriving without corresponding sustainability of the standard of living of operators.

The last attribute that significantly impacts daily income is ATBAN with a regression estimate of 0.070, which is significant at 0.05 levels. It is a counter-intuitive outcome that says, should the threats of banning *okada* operations double the present level, daily income will increase by 7% or N21.00 daily. ATBAN is an attitudinal factor, which can sometimes be difficult to explain. It may be that, operators are envisaging a ban on *okada* activities in future and will react to that eventuality by making more money now before a ban becomes a reality. This outcome shows a self-defense mechanism, which may become unnecessary with a good policy on *okadas*.

Collectively our parameters of analysis show that they are relatively exhaustive and quite efficient in explaining variation in daily income of operators. With an F-ratio of 0.705, which is very significant at 0.001 the factors collectively account for about 70.50% variation in daily income of operators in the city. It must be appreciated that, other factors that are not analyzed now account for the residual variation of 29.50%. These factors are sometimes cultural and psychological. For example some operators hang charms on their machines with the belief that such will help to increase daily income by attracting passengers. Such superstitions and mystical beliefs do not lend themselves easily to empirical investigations.

Conclusion

This paper has identified the factors and estimated the parameters that influence the daily monetary income of operators of commercial motorcycles in Akure, Nigeria. Results obtained show that, the factors affecting daily returns are: the cordiality of existing relationship between operators and owners of operations; machine repair (maintenance) skills of operators; daily operations costs; other businesses of operators and the attitude of operators towards a possible ban by government on *okada* activities.

Some of the findings in this paper have implications for policies on public transport in Nigeria. For example, the very strong influence of the relationship between operators and owners of business calls for a proper education through stakeholders' workshops and seminars for both parties on the need and mechanisms for maintaining mutually - beneficial relationships to enhance daily income. Ultimately, the strong influence of this variable could be eliminated altogether by encouraging ownership of operations through the widening of the existing cooperative activities among *okada* operators. Again, the numerous poverty alleviating agencies like the National Directorate for Employment (NDE) and the Family Economic Advancement Programme (FEAP) should provide soft loans to operators.

Findings have shown that, not less than 60% could carry out some form of simple repair skills like fixing punctured tyres, replacing dead engine plugs, etc. The municipal authorities should organize training workshops using professional machine repairers to train operators, so that, complete self-maintenance of machines can be achieved by the operators.

Efforts should be made to reduce the daily operations costs of *okadas* by streamlining daily ticketing through the elimination of multiple issuance of tickets and sundry levies by union and local government officials and touts. Severe penalties should be visited on corrupt police officers who accept bribes in order to look away from traffic infringements. Police officers caught taking bribes could be dismissed to deter others from carrying on with this obviously illegal habit.

The only way that official policy can help to eliminate the influence of competing business on *okada* activities, is by making operations fully profitable. One, *okadas* should be recognized as a mode of public transport and provision for rules and codes designed to enhance operations and eliminated noticeable problems should be enacted. At present, very few state governments have recognized the use of motorcycles for public transport. The air of illegality surrounding the operations of *okadas* does not encourage full-time participation by some operators. It engenders an attitude of wait-and-see, a situation that makes the existence of this mode tentative and highly informal. *Okadas* evolve spontaneously because of economic difficulties and they will not disappear until Nigeria's economy improves.

It will obviously be a wrong-headed policy to contemplate a ban on *okada* operations by the government. The fact that an expectation of a ban is provoking increased daily income shows that operators may not be happy or agree to a ban. A ban will create serious employment problem for young school leavers who form the bulk of operators

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**APPENDIX
RESEARCH VARIABLES**

S/NO	TRANSIT VARIABLES
1	Total hours of operation
2	Passenger carrying capacity
3	Hour of commencing operations
4	Hour of stopping daily operations
5	Origin of passengers
6	Destination of passengers
7	Waiting time of operation in between trips
8	Protective wares in transit by operators
9	Areas of regular daily operations
10	Attitude towards Traffic hold-ups
11	Common weather hazards
12	Maintenance (Repair) skills
13	Maintenance lag of broken down machines
14	Number of accidents in 1998
15	Common sickness of operators
16	Peak hours of operation
17	Existence of Union
18	Assessment of union activities
19	Riding experience
20	Trip time
21	Condition of Roads
22	Tendency to speed

26	Daily cost of operation (Monetary)
27	Daily Profit
^8	Daily Return
29	Daily Total trips
30	Garaging Costs
31	Method of passenger Search
32	Possession of Harkney Permit
33	Attitude toward possible ban of operations
34	Common problem of operation
35	Year of commencing operations
36	Location of business commencement
37	MACHINE CHARACTERISTICS Capacity of machine
38	Age of Machines
39	Brand of Machines
40	Method of Purchase
41	SOCIO-ECONOMIC PROFILE OF OPERATORS Ownership of Machine
42	Employment history
43	Number of machines owned
44	Possession of concurrent job (Government)
45	Possession of simultaneous business
46	Owner - Operator's relationship
47	Drinking habit of operators
48	Level of Education
49	Age of operators
50	Sex
51	Family size
52	Motive for entering business

Source: Author's Fieldwork 1998