

OPERATIONAL CHARACTERISTICS OF PARA-TRANSIT MODES IN AKURE, NIGERIA**Owolabi A.O and Akinwumi D.O.**

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E-mail: bayodistinct@yahoo.com**Abstract**

The operational characteristics of para-transit modes in Akure metropolis have been appraised with a view to designing a well coordinated system. Data on the cogent indices of metering operations, attributes of operators and patrons of para-transit modes were collected in-situ at the mode terminals and garages. This was corroborated with the use of information cards, which were completed under interviewers' supervision. This work provides data base on operational characteristics of para-transit modes in Akure, a developing capital city in Nigeria, which could be applied to similar cities. Some of the striking findings from the data analysis are that operators of motorcycles (okada) and tricycle (keke NAPEP) are mostly inexperienced, hence, the reason why they are the most 'vulnerable'. It was also discovered that operators of para-transit modes in the study area are mainly semi literate, some of them had been either an apprentice in one skill or the other like bricklaying, welding and auto mechanics. Also, only few operators of para-transit modes would like to transfer the business to their children, thus making their sustainability suspect. The results of this study could form a basis for the design of schedules for para-transit operations in Akure metropolis. Such schedule should eliminate motorcycle and tricycle from the main trunk or express way. Rather, they are to serve as feeders to main trunk by conveying commuters from the suburbs to the nearest terminals where they can make use of other modes. It has been recommended that a systematic program of reverting back to the use of conventional buses should be evolved to cater for increasing demand.

Key words: Para-transit, Operational-characteristics, Operators, Patrons, Akure.**Introduction**

Operations of Para-transit modes (also known as informal transport) is a global phenomena. Plying the streets of cities of Africa, Asia, North America, South America, Europe and Australia are fleets of these small, low performance vehicles driven by private operators that serve low income neighbourhoods and sometimes, elitist settlements. They fill a market void left by a dearth of public bus service (Yearseley, 1989). Typically, vans or mini buses are used to provide Para transit services, but shared taxis and motorcycles have also become important providers (Cevero, 2000). Para transit services may vary considerably, depending on the degree of flexibility and services they provide to their customers. At their simplest, they may consist of taxis or small buses that run along defined routes, stopping to pick up or discharge passengers on request (Fouracre *et. al.*, 1992). At the other end of the spectrum, the most flexible Para transit systems offer on-demand call-up door-to door services from any origin to any destination. In most urban centres of the developing world, two wheeled motorcycles and three wheeled tricycles para transit operations thrive in spite of insinuation of high accident risks. Perhaps the greatest advantage of this category of para transit is ride – to door service they offer to commuters and their availability (Oseni 1999). Other authors that have conducted research on operations of para-transit modes across the world include Maunder *et. al.* (1981), Case & Latchford (1981), Newton (1994), Hudgens & Rischard (2000), Burke (2002) and Owolabi (2009, 2011).

The para-transit modes considered by the authors can be grouped into five, taking into consideration passenger capacities and coverage as follows: modes with passenger capacities of 1-2, 2-4, 4-6, 8-10 and 10-25. Details of the Country / city in which the modes are used,

Vehicle capacity, Method of operation in terms of routes, stops, fares and coverage are illustrated in Tables 1a and 1b.

Nigerian experience has been that conventional public transport systems do not survive for long because of poor management. For most cities, Akure inclusive, there is no well-organized transit system and public transport trips are undertaken with assorted types of Para-transit vehicles. Hence, any study aimed at ameliorating problems faced by commuters in Akure must take into cognizance the dominance of the Para-transit modes.

Table 1a: Summary of Para-transit Modes in Cities of the World

Mode	Country/City	Vehicle Capacity	Method of operation			Coverage
			Routes	Stops	Fares	
Shared ride Taxi	Indonesia	1	Varied	On demand	Negotiable	Within the town
Contract carriers	Jamaica	1 or more	Varied	On demand	Negotiable	Variable
Okada, going, achaba, express, onanga	Nigeria	2	Varied	On demand	Negotiable	Within the town
Ojek, Bicycle, Becack, Helikak	Indonesia	2	Varied	On demand	Negotiable	Within the streets
Motorcycle taxi (favelas)	Brazil, China	2	Varied	On demand	Negotiable	Within the streets
Motor-dub (Okada)	Cambodia	2	Varied	On demand	Negotiable	Within the streets
Trishaw	Los Angeles, USA	2	Varied	On demand	Negotiable	Within the streets
Tongas	India	2	Varied	On demand	Negotiable	Within the streets
Motor conchos	Dominican republic	2	Varied	On demand	Negotiable	Within the streets
Auto rickshaw	Delhi, India	3	Varied	On demand	Negotiable	27km
Pedicab	Havana, Cuba	3	Varied	On demand	Negotiable	4km
Samlor	Thailand, USA, Canada	3	Varied	On demand	Negotiable	3km
Texxi	UK	4	Fixed	On demand	Varied/fixed	Within the streets
Motorised scooter	China	4	Fixed	Fixed	Fixed	Wide coverage
Kabukabu	Nigeria	4-5	Fixed	Fixed	Fixed	Within the city

Table 1b: Summary of Para-transit Modes in Cities of the World

Mode	Country/City	Vehicle Capacity	Method of Operation			Coverage
			Routes	Stops	Fares	
Tap-Tap	Haiti	5	Fixed	Fixed	Fixed	Both within and outside the cities
Tro-Tro	Ghana	5	Fixed	Fixed	Fixed	Within the Cities
Matatu	Nairobi Kenya	8	Fixed	Fixed	Fixed	On the streets
Route taxi	Jamaica	8	Fixed	Fixed	Fixed	Large coverage
Jeepney	Philippines	8	Fixed	Fixed	Fixed	
Danfo	Nigeria	9-10	Fixed	Fixed	Fixed	Within the cities
Opelet	Philippines	9	Fixed	Fixed	Fixed	Remote areas
Mikrolet	Indonesia	15	Fixed	Fixed	Fixed	5km
Fulafula	Congo	15-20	Fixed	Fixed	Fixed	On the streets
Mini bus	Malaysia, Thailand, Vietnam, Central Africa, Philippines, USA, Canada, Indonesia, Nigeria	12-14	Fixed	Fixed	Fixed	8-15 km
Gbaka	Cote d'Ivoire	13	Fixed	Fixed	Fixed	Varied

The Study Area

Akure metropolis is the capital city of Ondo State, Nigeria. It is located in the northern part of the state around latitude $7^{\circ} 15'$ North and longitude $5^{\circ} 15'$ East and has an area of approximately 30.02 square kilometres. Its population was estimated at 353,211 according to 2006 census. This consisted of 175,495 (49.68%) males and 177,716 (50.32%) females who are mainly civil servants, traders and peasant farmers. The traffic situation in Akure is similar to what obtains in other urban settlements in Nigeria. There is a fairly good network of roads consisting of main distributors and collector streets (Figure 1). It has been established that about 97% of the population in Akure depend on public transport (Owolabi, 2009). This huge demand exerts a great strain on available facilities and because of institutional and funding constraints, conventional transit systems are not presently available. Hence some unconventional para-transit public transport modes like motorcycle and private vehicles not registered as taxis known as "Kabu kabu" supplement taxi cabs and mini buses.

The Para-transit sector in Akure is well administered. This responsibility falls principally on the shoulders of Association and Unions such as Amalgamated Commercial Motorcycle Owners and Riders Association of Nigeria (ACOMORAN), Ondo State Taxi Drivers Co-operative Multipurpose Union, Road Transport Employers Association of Nigeria (RTEAN), and National Union of Road Transport Workers (NURTW). These Associations/Unions maintain some level of regulatory control over Market entry, Indemnification, Pricing, Service practices and vehicle fitness. Other duties to members include Protection of their interest and serving as media through which the government at various levels could reach them, supporting their members financially especially when involved in accident, liaison with security operatives for help as well as recovery of stolen vehicles in cases of reported theft, and organizing seminars for members to enhance performance.

This research is aimed at appraising the operational characteristics of Para-transit modes in Akure to aid the design of a well coordinated system.

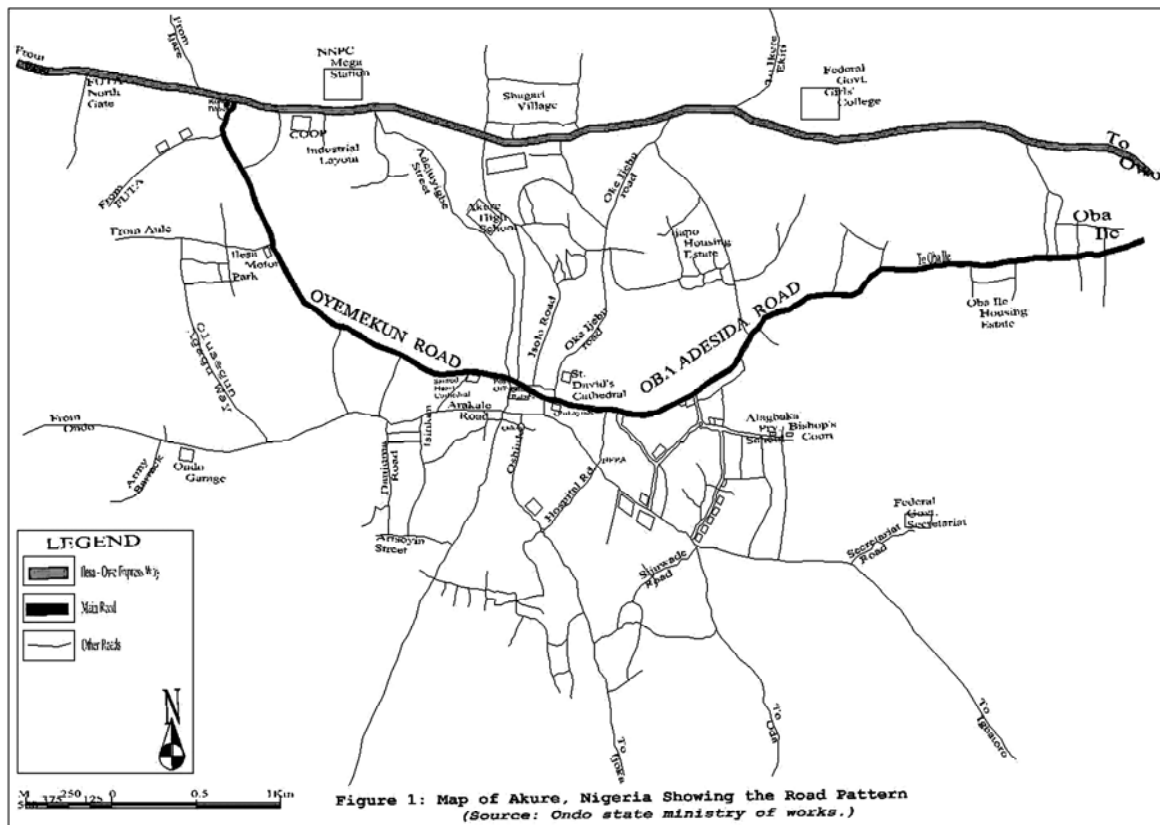


Figure 1: Map of Akure Nigeria Showing the Road Pattern

Methods

An inventory/assessment of existing transport terminals in Akure metropolis were undertaken to facilitate the attainment of study objectives. Data were collected on attributes of operators, patrons and operational characteristics of para-transit modes. Data relating to operational characteristics include commencement time, break time, closing time, coverage, cost of operation, cost of maintenance, daily profit, sustainability, accident/safety records and Government involvement. Those related to operators include age, sex, marital status, educational background, professional status, years of experience, daily income, ownership of modes and the number of operators per mode. Data on attributes of patrons include sex, age, occupation, status, income, mode used in making trips, reasons for choice of mode, modal preference and service rating. To generate the necessary data, information cards, which were completed under interviewers’ supervision, were administered. This was complemented by In-situ data collection at the mode terminals and garages to obtain other information that were not on the cards.

Sample Size

Bureau of Public Roads (1954) and O’Flaherty (1974) suggested sample sizes for conducting home – interview Origin – Destination (O-D) Studies. The recommended sample sizes are shown in Table 2.

Table 2: Recommended Sample Size for Conducting Home Interview O-D Studies

Urban Population	Sample Size
< 50,000	1 in 5 dwelling units
50,000 - 150,000	1 in 8
150,000 – 300,000	1 in 10
300,000 - 500,000	1 in 15
500,000 - 1000,000	1 in 20
> 1000000	1 in 25

Using the 2006 population figure of 353,211 and a growth rate of 4% (as recommended by TRL, 1977), the projected population of Akure for year 2010 was estimated as 413,207. The estimation was based on equation (1), (Barclay, 1958).

$$P = P_0(1 + r)^n \dots\dots\dots (1)$$

Where:

- n = number of years of projection
- r = growth rate.
- P₀ = population size at time zero
- P = projected population at a time, n years later

Considering the projected population a sample size of 1 in 10 i.e. (10%) was adopted for patrons rather than 1 in 15, (suggested in Table 2) to ensure wider coverage, since the projected population was at the lower limit of the 1 in 15 sample size range. A sample size of 1 in 5 was adopted for operators of para-transit modes based on a population of 26000 obtained at the terminals and union offices.

Results and discussion

Findings show that the para-transit modes generally operate between 5:00 am and 8:00 pm. However, taxi cabs extend operation till 9:00pm while keke NAPEP close earlier at 7:00 pm. Motorcycle and taxi cab operators observe their break between 1:00 to 2:00 pm while those of keke NAPEP, kabukabu and mini bus observe theirs while waiting for their turn to load. Results also indicated that buses cover the longest average distance of about 8km on the average, while the coverage for motorcycles, taxi cabs, keke napep and kabukabu are 3km, 4km, 5km and 6km respectively. Table 3 shows the costs of operation, maintenance and daily profit of the modes. The average monthly operational costs ranged from N12, 000 (\$80.00) to N20, 000 (\$133.33), while average cost of maintenance and daily profit ranged between N4,800 (\$32.00) and N10, 000 (\$66.67). Operators own about 29%, 62%, 26% and 78% of motorcycles, buses, taxi cabs and kabukabu respectively. The remaining 71%, 38%, 74% and 22% are operated on behalf of the owners. It was observed that keke NAPEP is fully owned by the state government.

Table 3: Operational Attributes of Para-transit Modes

Mode	Monthly Cost of Operation		Monthly Cost of Maintenance		Daily Profit		Proportion involved in Accident (%)
	₦	\$	₦	\$	₦	\$	
Taxi cab	20000	133.33	2500	16.67	2500	16.67	40.82
Kabukabu	16000	106.67	1500	10.00	1800	12.00	
Motorcycle	16000	106.67	1500	10.00	1800	12.00	
Keke NAPEP	12000	80.00	1200	08.00	1200	08.00	-
Mini bus	14000	93.33	1200	08.00	1800	12.00	10.20

Source: Field data

Table 4 shows the attributes of operators of para-transit modes. The operators are all male, working on either full or part time basis (the part time operators include those that resume operation after government work). Usually, more than one operator run each mode daily. Their age range is between 30-40 years for keke NAPEP, taxi cabs and mini buses drivers while those of okada riders, and kabukabu drivers are between 20-30 and 40-50 years respectively. Mini bus drivers are the most experienced while riders of keke NAPEP and okada are the most inexperienced, hence, the reason why safety/ accident records (table 2) show that okada riders are most prone to accident. The operators are mainly semi – literate, some of them had either been masons (bricklayers), welders, auto mechanics, or involved in auto businesses. It was

striking that despite reasonable gain that accrued to operators of all the modes, only a few of them would like to transfer the business to their children, hence the sustainability of operations is suspect!

Table 4: Characteristics of Operators of Para-transit Modes

Mode	Marital Status		Age				Nature of Vocation		Years of experience						Number of Operators	
	Single	Married	20-30	30-40	40-50	50-60	Full Time	Part Time	<1	1-2	2-4	4-5	5-10	>10	One	Two
Okada (%)	60	40	61	28	-	11	47	53	29	12	41	-	18	-	82	18
Keke NAPEP (%)	-	100	-	70	30	-	60	40	-	40	60	-	-	-	80	20
Taxi cab (%)	29	71	32	52	16	-	74	26	10	-	48	-	26	16	58	42
Kabukabu (%)	-	100	3	43	47	7	81	19	2	20	38	-	19	21	77	23
Mini Bus (%)	11	89	17	40	29	14	82	18	2	3	18	3	12	62	61	31

Source: Field data

Table 5 shows the attributes of patrons of para-transit modes. It was observed that the modes are mainly patronized by females, possibly due to the fact that most males make use of the family cars while their spouses are left with no other alternative than the para-transit modes. Majority of patrons of para-transit modes in the metropolis are low income earners below the age of 50, while a few aged patronize keke NAPEP, taxi cab and kabukabu. Those who patronize kabukabu and mini buses do so because they are readily available and cheap. Those who patronize motorcycles do so because of their ability to penetrate suburbs where other modes would not reach while those who patronise keke NAPEP do so because of absence of alternatives and low fare. Patrons of taxicabs patronize the mode because they are readily available and comfortable. Majority of patrons rate the services of keke NAPEP and kabukabu as fair and those of okada, taxi cabs and mini buses as good.

Table 5: Characteristics of Patrons of Para-transit Modes

Mode	Sex		Age					Occupation				
	Male	Female	<20	20-30	30-40	40-50	50-65	Traders	Students	Civil Servants	Farmers	Others
Okada (%)	33	67	-	8	72	20	-	54	22	15	-	9
Keke NAPEP (%)	42	58	-	25	33	25	17	25	32	32	11	-
Taxi cab (%)	17	83	10	36	28	23	3	26	24	36	-	14
Kabukabu (%)	32	68	6	24	40	28	2	20	17	34	5	24
Mini Buses (%)	25	75	20	13	40	27	-	56	17	6	-	21

Source: Field data

Conclusion

The operational characteristics of para – transit modes in Akure metropolis have been appraised. Data on the cogent indices of metering operation of para-transit modes and attributes of their operators and patrons were collected and analysed. Results of analyses show that

operators of para-transit modes in the metropolis are all semi literate males. Their age range is between 30-40 years for keke NAPEP, taxi cabs and mini buses drivers while those of okada riders , and kabukabu drivers are between 20 -30 and 40-50 years respectively. Riders of keke NAPEP and okada are the most inexperienced while mini bus drivers are the most experienced. Findings show that only few operators of para-transit modes would like to transfer the business to their children, thus making their sustainability suspect. Majority of patrons of para-transit modes in the study area are females. This is possibly due to the fact that most males make use of the family cars while their spouses are left with no other alternative than the para-transit modes. This work provides a data base on operational characteristics of para – transit modes in Akure, Nigeria, which could be extrapolated to cover similar cities in developing world. The results and analyses could be used to design schedules for para- transit operations in Akure metropolis. The operational schedule could be designed to eliminate motorcycle and tricycle on the main trunk or express way. Rather, they are to serve as feeders to main trunk by conveying commuters from the suburbs to the nearest terminals where they can make use of other modes. A systematic program of reverting back to the use of conventional buses should be evolved to cater for increasing demand.

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