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# Non-motorized transport of goods: A focus on Oja Oba and Isikan market, Akure, Ondo State, Nigeria

Olaogbebikan Jimoh Eniola \*

Transport Management Technology Department, Federal University of Technology, Akure, Nigeria

## Abstract

This study examines the efficiency of Non - Motorized Transport in the transportation of market wares in Oja Oba and Isikan Market. It also evaluates the opinion of the operators of the transport mode. The study relied on the survey research technique to gather relevant data from the respondents using the questionnaire as the research instrument. The study identified the various challenges facing this means of transport in these two markets. The paper adopted a case study approach and systematic random sampling was used in administering the 300 questionnaires among the operators and those making use of this means of transport, 200 questionnaires for Oja Oba and 100 questionnaires for Isikan Market were administered and the analyses was done using the Statistical Package for Social Sciences (SPSS) to determine the capacity of the Non – Motorized transport in the two markets. The study recommended that Nigerian government should invest extensively in Non-Motorized transportation by providing infrastructure, terminals and financial aids to the operators of the Non Motorized transport; Cycle Rickshaw should also be introduced as practiced in Indonesia. There is a positive relationship between the efficiency, weight of load and distance but a negative relationship in the speed of Non-Motorized transport.

**Keywords:** Non-Motorized; Transport; Market; Goods; Efficient

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\* Corresponding author. E-mail address: eniolajimoh2@yahoo.com

## 1. Introduction

Wheel barrow, hand push cart, human portage, cycling as well as walking or pedestrianization are the various Non-Motorized Transport, but this study focuses its searchlight on the first three. This mode provides both recreation and access to goods and various activities. It plays essential role in urban transport in most low and middle income countries such as Nigeria and India. For people in the lowest rung of income ladder, the mode effects survival. The contributions of non-motorized transport mode to transportation of goods cannot be overemphasized. Non-motorized transport promote commercial activities in a developing country like Nigeria it is also environmentally friendly. Before the advent of motorized transport, non motorized transport had been in existence over ages for the movement of goods and services. Non-motorized transport and its contributions to the movement of goods and services serve as the focal point in this work, most especially in the movement of goods in Nigeria markets.

Non-motorized transport is predominantly used in the rural community in Nigeria and most African countries for movement of their goods. The markets in Cities of the developing countries also make use of Non motorized transport. China is one of the countries that are making use of Non – Motorized Transport means. The practice of human portage is paramount in Nigeria where the women and children carry their goods on the head while the men carried their goods on their shoulders. Users of these modes are often prone to dangers of automobile accident and longer time to cover their destinations due to the neglect attributable to this mode. The result of this action in many ways favors the Motorized Transport at the expense of Non Motorized Transport. Okoko (2011) while examining transportation and rural development in Akwapin south district in Ghana posited that the high cost of motorized transport as well as the low income of the rural dwellers encourages the usage of Non Motorized transport like head porterage, bicycle, head loading, walking in the rural areas.

Shomuyiwa (2010), opined that maintaining sustainable cities, a recognition that is being translated into reality in parts of the developed world is being ignored in most of the developing world. Therefore getting into some areas require some form of non-motorized transport. The markets as commercial centre still harbor jobless able men and women living in abject poverty who cannot see, seek or take advantage of the transportation situation of the market by engaging themselves in the movement of loads (goods) through Non-Motorized Transport so as to enhance their means of livelihood. This is partly because interested operators of non-motorized vehicles are finding it difficult to finance the acquisition of Non-Motorized vehicles and there is no adequate support and assistance by the government to encourage them.

Unlike the developing countries developed countries have made adequate provision for Non – Motorized transport in their cities. In Amsterdam, for example, bicycle use is encouraged and bike lanes and bike parking lots have been constructed. Adequate right of ways is given to bicyclists on the main streets with cycle routes. In Havana, Cuba, one out of every three trips in the city is made by bicycle and bicycle travel in Havana competes with buses in terms of number of trips.

### 1.1. Significance of non-motorized transport

Non-motorized transport is broadly used in underdeveloped and developing nations to improve the efficiencies of direct productive task and to serve as a bridge between rural fields, villages, towns and road networks or market. It is labour and time saving and productivity increasing devices, it is also environmentally friendly which satisfies the clamor for green transportation and sustainable environment. In spite of the above gratifying advantages, it is saddled with numerous challenges. The challenges faced by this mode are low patronage by potential users and government unwillingness to undertake investment needed to acquire such devices and to maintain the usually rudimentary infrastructures needed to operate them efficiently. Non-motorized transport is pocket friendly in terms of capital needed to invest in it but most intending operators find it difficult to raise such capital to purchase a push-cart or wheel barrow to kick start the business and therefore they have to either hire and pay rent on daily or weekly basis depending on the agreement with the owners, or remain a head shoulder porter (human porterage).

Non-motorized transport is also faced with the problem of over reliance on motorized transport for transporting of market wares by marketers due to insufficient quantity of non motorized vehicles being put to use. This make the work so hard and laborious, pullers and pushers always sweat profusely before they can push truck with loads to their destinations especially at full loads and when climbing hilly areas. In most times, non-motorized vehicles are always at conflicts with the users of the motorized transport because of the lack of provisional infrastructures to favor non-motorized vehicles e.g. separate non motorized lane like bicycle and cycle rickshaw lane, there is the need for pedestrian lane for those engaging in head portage which can also be complement with pedestrian road side arboriculture in order to make trekking under hot condition less strenuous. Furthermore, there is always the problem of communication between the users and operators of this mode of transport as a result of the low literacy level of the operators. As a result of this, the operators and the users of the vehicles find it difficult to bargain effectively during transactions and therefore cause some sort of delay. The non-motorized operators are constantly exposed to hazardous climate, weather and environmental conditions. Many of them are exposed to environmental pollution for about 12 hours in the day; all these factors affect their health and social life as they spend a large portion of their incomes on drugs to prevent or fight sicknesses and diseases; they also go on smoking and drinking hard drugs to improve on their strength and stamina on a daily basis and these goes a long way to discourage intending operators towards engaging in non-motorized transport more so when their take home may not be substantial (Somuyiwa, 2010). Patrick et al. (2005) while commenting on non motorized transport in Kenya said that the non-motorized modes of transport comprise e.g. bicycles (*boda boda*), hand-carts (*mkokoteni*), animal carts and human porters. Although non-motorized transport modes carry a lower maximum weight and have a shorter range than motorized modes of transport, they have a larger flexibility in terms of travel routes and reach into remote rural areas, following foot paths and tracks which may occasionally be constructed, but often are made over time by the wear of users. Because of low labour costs the ton-km costs are also much lower. Some bicycles and carts are owned by individual farmers and small businessmen and used for their own account. However, because individual owners may have difficulties utilizing the investments efficiently, many bicycles and carts are operated for hire. Such bicycles for hire may be owned by the operator, but are more often hired for a fee from owners with one or more bicycles, who may not be

involved in the actual operations. The physical requirements make the operation of *boda boda* and handcarts exclusively young male businesses. But it should be remembered that women are predominant when it comes to human porters, partly due to their traditionally greater role in the provision of labour for agricultural production and produce marketing. In a number of provincial towns *boda boda* operators have established organizations which regulate the operations, for instance through requirements of registration, identification and dress code, operation of departure stages, and organization of credit and welfare associations. This organization has increased the security of transport and the trust between the operators and their customers. Thus we found in a survey of small entrepreneurs in the small town of Siaya that they increasingly entrust *boda boda* operators to collect and deliver goods already paid for in wholesale shops or even giving them money for purchase and delivery of the goods to their shops/kiosks. It is noteworthy that non-motorized is not well organized in Nigeria as we have it in Kenya. Bicycle usage is not well pronounced in Nigeria general observation show this. There is the need to encourage bicycle usage in Sub-Saharan Africa.

In Kenya, more than ninety percent of rural trips are on foot, four percent by bicycle, two percent by Para transit and only half percent by bus. The major arterial roads of the city must be made Non Motorized Vehicle (NMV)-friendly. Dedicated NMV routes through parks, green belts and narrow city streets could serve as additional network capacity for cyclists. Pedestrians, cyclists and non-motorized Rickshaws are the most critical elements in mixed traffic. If the infrastructure design does not meet the requirements of these elements, all modes of transport operate in suboptimal conditions. There is now a growing recognition that these traditional means of transport can play a vital part in maintaining sustainable cities (Replogle, 1992; 1993). Howe et al. (2000) submitted that non motorized transport should be encouraging because it is a potent weapon for poverty reduction as Non motorized convey economic benefits to the owners and that non motorized transport should be given more prominence than in the past.

The aim of this study is to appraise the efficiencies of non-motorized transport in the movement of goods in the study area and the objective of the study are to identify the non-motorized transport in the study area, to examine the services of the non-motorized transport in the study area.

## 2. Conceptual underpinning and literature

The use of non motorized transport has affected the social and economic wellbeing of various communities. Some of the transport models are: Concentric model, Sector model, Multi nuclei model. For the purpose of this study concentric model shall be considered.

### 2.1. The concentric model

Omata et al. (1986) while commenting on the Concentric Model that was developed by Burgess (1929) after the study of Chicago noted that the spatial manifestation of land use is a concentric pattern of land use around the core. Outside the CBD, Burgess identified the zone in transition, the zone of independent working men's homes, the zone of better residence, and the commuters' zone in increasing distance from the centre. The determination of which land use or who locate in which zone depends on the ability to pay for the value

of land at the relevant location. It is in this way that commercial activities win the competition for more central location because of their higher return hence the study areas are the major commercial centers located close to the CBD, the transition zone of mixed residents and commercial activities also has residential homes i.e. inner suburb. The activities here involve physical distribution. It is the broad range within a system, concerned with the efficient movement of goods and materials both inward to the point of manufacture and outward from the end of production line to the consumers. Physical distribution managements aim to achieve the highest possible measure of efficiency in the physical distribution activity. The fundamental aim of distribution system is to transfer products from the place of manufacture or production point to the place of consumption. The system is to provide service to customers who pay to receive goods as ordered. It also matches production output to the market demand by holding goods until they are required and delivered them where they are needed, of which non motorized transport plays an important role.

Literally, transport is defined as a system of carrying people and goods from one place to another using vehicle on road. (Oxford advanced learner dictionary, 6<sup>th</sup> edition). Transportation is the movement of people and goods from one place to another and it is performed by various modes such as air, rail, and water.

Non-motorized transport can substitute directly for automobile trips. Walking and cycling also support public transport. When driving disincentives such as parking and pricing or other market reforms reduces automobile travel typically 10-15% of the reduced trips shift to walking and cycling (transport elasticity). In recent years several evaluation tools have been developed to predict demand of non-motorized transport travel, evaluate walking and cycling conditions and predict the effect of pedestrian and cycling. Non-motorized can substitute directly for automobile trips. Virtually every transport ends with a walking or cycling trip, whether between a parking lot and an office building or a home and a bus station. Fixing people to walk or bicycled a long way out of the way. It has very economic cost because of the slowness of travel by this mode. At three kilometers per hour, having to walk a kilometer out of your ways add 20 minutes to your trip. In some countries it now takes a long time for people to walk from their homes to the nearest bus stop as it takes to move from Sao paulo to Rio de Janeiro (Hook, 2003).

## 2.2. Basic non-motorized forms of transport

### 2.2.1. *Wheel barrow*

These are one – wheel vehicles with a carrying unit made of steel pan with two sides handle for Pushing or drawing the vehicle. A single person usually operates it either for the movement of personal goods or for hires and reward services. The types used in the study area are fortified by welding iron rods round the carrying unit and the stands to withstand the effects of the loads and for durability.

### 2.2.2. *Hand push cart*

They are commonly referred to as trucks; they are two wheel vehicles. Some are well raised from the ground to allowed easy passage on rough roads. While some have flat platform or carrying units, some are well

covered to protect goods in transit against adverse weather condition. They are usually operated by one or two people depending on the age, experience, topography or terrain of route and the type of freight involved. Sometimes also, the users or consumers are required to give in some assistance by pushing the truck at the back especially where passage is difficult.

### *2.2.3. Head porterage*

This is the oldest and most common form of non motorized transport for the movement of goods in the Oja Oba and Isikan market. Male and female, young and old are involved in the business, while female carry the goods on their head, their male counterpart preferred to carry the goods on their shoulders and backs. They provide door to door, goods transfer services; they are mainly employed for loading and off-loading purposes, from stores to trailer or from trailers to the stores especially where the roads leading to the market are narrow and inaccessible to trucks such as in the case of this study area.

## **3. Research methodology and the study area**

### **3.1. Research methodology**

The target population for the study is total number of population under the study area. It is assumed that the population is one fourth of the total area of Akure in 2006 population census. It is estimated that the total number of Akure inhabitants are 387,087. A projection was made with formula below;

$$P_t = P_0 (1+r)^n$$

The expected population in Akure based on 2010 projection is 432,296 persons since it is assumed that the study area would be inhabited by one quarter ( $\frac{1}{4}$ ) of the total population. For the purpose of this research, a total population of three hundred (300) respondents were interviewed which represents 0.3 percentage (%) of the total population which are the users and providers of the non-motorized form of transport. It is assumed that these strata of the population have common propensity which is assumed to have relevant contributions to the study.

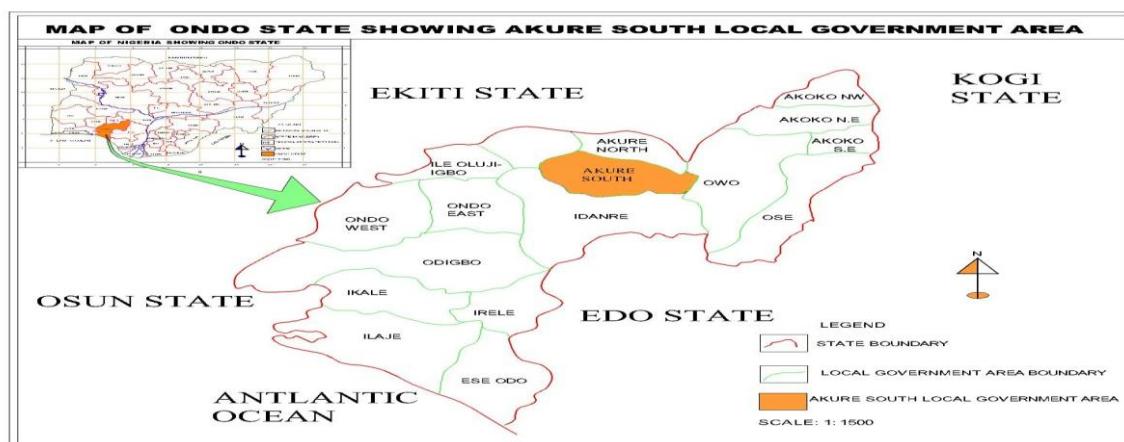
The total numbers of three hundred (300) questionnaires were administered in the study areas. Two areas were identified and selected for administering of the questionnaires. These areas serve as the focal point for this research. The Oja oba market covers a larger proportion of the population therefore, two hundred questionnaires were dispensed while the Isikan market has a fair number of the population therefore one hundred questionnaires were dispensed. They are basically market places where commercial activities are practiced. The sampling technique used for the purpose of this research work was random sampling. Random sampling is one drawn in such a way that every possible element of the population has an equal chance of being selected. It was used to collect data from the market men/women, head porters, cart pushers, wheel barrow pushers.

In this research work, the technique applied for information gathering were questionnaire administration and personal interview with the respondents. A large proportion of the data needed was obtained from the

respondent through questionnaire and photograph equipments for capturing images on non-motorized means of transportation in Akure.

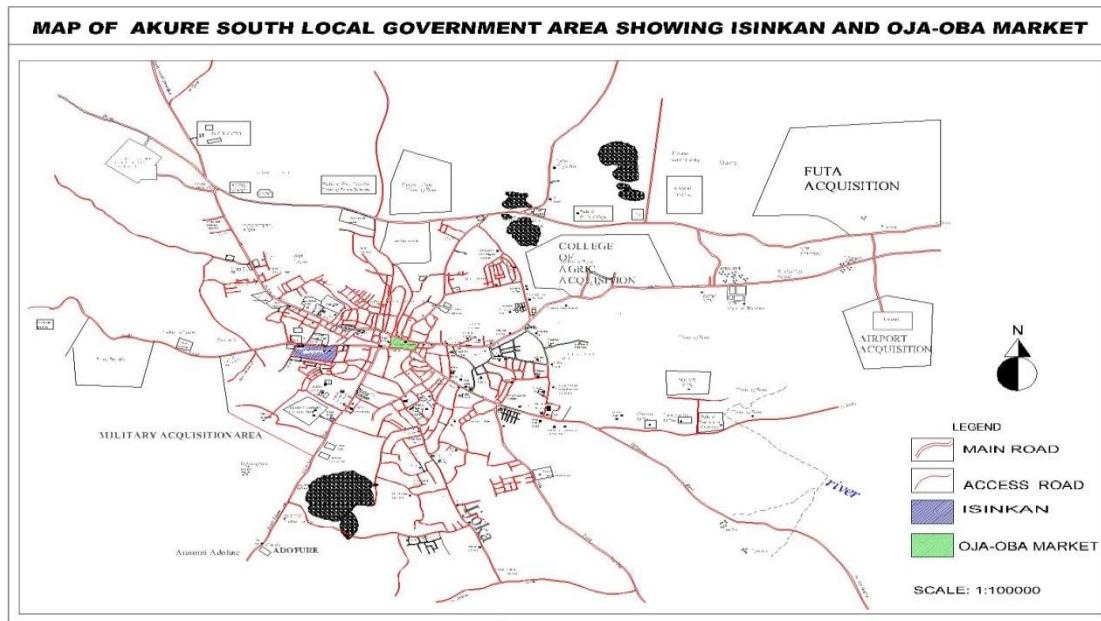
### 3.2. Study area

The study area for this research is Akure (Oja oba and Isikan market). Akure is a city in the southwestern region of Nigeria and it is the capital of Ondo state. The city has a population of approximately 387,087. The inhabitants of this area predominantly are the Yoruba group. The Oba palace is located at the centre of the town, and was built in 1150 AD. Akure town is located at latitude  $7^{\circ} 16' 48''$  N and longitude  $5^{\circ} 14' 41''$  E. It has over 15 courtyards with each having its unique purpose. At present, a bigger and more modern palace is being built to the south palace's ground, Oja oba , which means that the oba's market is just a stone throw away from the palace. The Isikan market is also located in the Akure town in the area called Isikan. It is fairly an ultra modern market with moderately medium size along Ondo road. The town is spontaneously being modified as a result of increasing industrial, commercial and social service in the area. Ondo state is made up of eighteen local government areas and they are stated as follows; Akoko north-west, Akoko south-east, Akoko south-west, Akure north, Akure south, Ese odo, Idanre, Ifedore, Ilaje, Ile oluji/okeigbo, Irele, Odigbo, Okitipupa, Ondo west, Ondo east, Ose, and Owo. The map of Ondo State showing Akure South Local Government as well as the map of Akure South Local government showing Isikan Market and Oja Oba Market are presented below.



**Figure 1.** A kure South Local Government Area

Figure 1 shows the map of Ondo State showing Akure South Local Government Area.



**Figure 2.** Oja Oba and Isikan Market

Figure 2 shows the map of Akure South Local Government Area showing Isikan and Oja Oba Market.

#### 4. Presentation and analysis of data

This deals with numerical presentation of data collected, for the purpose this research work data collected from Oja Oba market were presented below.

**Table 1.** the range of the age of the users of non-motorized transport

Age (years)	Frequency	Percent	Valid Percent	Cumulative Percent
15 – 19	40	20.0	20.0	20.0
	70	35.0	35.0	55.0
	60	30.0	30.0	85.0
	30	15.0	15.0	100.0
TOTAL	200	100.0	100.0	

*Source: field survey 2015*

Table 1 above revealed that 20 – 24 years constitute the highest which is 35% of the total number of users of NMT in the study area while age 25 – 30 years constitute 30%.

**Table 2.** The sex of the users of non- motorized transport in the study area

Sex	Frequency	Percent	Valid Percent	Cumulative Percent
Male	120	60.0	60.0	60.0
Female	80	40.0	40.0	100.0
Total	200	100.0	100.0	

Source: Field survey 2015

Table 2 shows the sex of the users of non- motorized transport in the study area. Male sex constitute the highest percentage

**Table 3.** Qualifications of the respondent

Qualification	Frequency	Percent	Valid Percent	Cumulative Percent
No Education	70	35.0	35.0	35.0
Primary school leaver	50	25.0	25.0	60.0
SSCE Holder	70	35.0	35.0	95.0
Tertiary Education	10	5.0	5.0	100.0
Total	200	100.0	100.0	

Source: Field survey 2015

Table 3 shows the qualifications of users of NMT 35% of the respondent are illiterate while 35% were Secondary School Certificate (SSCE) Holder while 25% are Primary School leaver and 5% have tertiary education.

**Table 4.** Means of transportation

Means	Frequency	Percent	Valid Percent	Cumulative Percent
Push Cart	50	25.0	25.0	25.0
Wheel Barrow	110	55.0	55.0	80.0
Human Porterage	40	20.0	20.0	100.0
Total	200	100.0	100.0	

Source: Field survey 2015

Table 4 above indicates the three major types of non-motorized vehicles identified in the study area, they include Human Porterage, that is Head porters (female) and Back-carriers (males); Wheel Barrow or one wheel vehicle and Push carts/trucks or two wheels vehicle This shows that about 55% of the people in the study area makes use of wheel barrow, while 25% and 20% uses push cart and human porterage respectively.

**Table 5.** The level of patronage by customers using the non-motorized transport

Level	Frequency	Percent	Valid Percent	Cumulative Percent
Rarely	50	25.0	25.0	25.0
Often	150	75.0	75.0	100.0
Total	200	100.0	100.0	

Source: Field survey 2015

Table 5 above indicates the level of patronage by customers using the non-motorized transport in the study area. This indicates that 75% of the population in the study area often makes use of non-motorized transport means while 25% rarely make use of it.

#### 4.1. Level of Influence of non-motorized transport in Oja Oba market

The operational coverage of non-motorized transports in the study area were major commercial motor parks or collection centers like Oke-ijebu, Arakale, Araromi and Isolo. They service different areas and locations from where the market attracts traders. The arrangement is such that, motorized vehicles park in the motor parks from where they link their exit routes to their destinations. Goods are bought and brought into the parks from the market by the use of non-motorized vehicles and the distance in relation with the price is shown in Table 6 below.

The study revealed that the longest, distance traveled within the study area by NMT is about 500 metres that is from Oja Oba to Araromi. It is interesting to note that the longer the distance traveled by the non-motorized transport moving about 200kg freight (by Push Cart/Barrow) and less than 50kg freight by human porters the more the fare charged in the study area. However, they could as well move freights outside the study area up to over 500meters on demand but this attracts additional charges. The analysis on fare charged on freight by NMT per distance is shown below

**Table 6.** Distance in relation with price

Distance (M)	Push cart charges		Wheel barrow charges		Human porterage charges	
	Naira	Dollar	Naira	Dollar	Naira	Dollar
50-100	60	0.30	60	0.30	50	0.75
100-200	90	0.45	90	0.45	80	0.40
200-300	120	0.60	120	0.60	110	0.55
300-400	150	0.75	150	0.75	140	0.70
400-500	180	1.90	180	1.90	170	1.85
500 above	210	1.06	210	1.06	200	1.00

The dollar prices were calculated by equating 199.05 Naira to a dollar. This was based on the Central Bank of Nigeria's online Exchange rate as at 01.04.2015

Table 6 above shows there is no significant difference in the prices charge by the operators of the Non Motorized transport mode. The price increases according to the distance covered by the operators. From Table 6 above it was revealed that the price charged by the various Non Motorized Transports in the study area increased with distance but the rate of increment are not substantial. With the range of distance covered the various Non Motorized mode in the study area can effectively covered those distance.

**Table 7. Efficiency**

Response	Frequency	Percent	Valid Percent	Cumulative Percent
No	30	15.0	15.0	15.0
	170	85.0	85.0	100.0
Total	200	100.0	100.0	

Table 7 above shows whether the various non motorized modes in the study area are efficient in the movement of goods in the study area. 85% of the respondents state that it is efficient.

In order to determine the efficiency of non motorized mode in the movement of goods in the study area the following hypothesis were subjected to test:

- $H_1$ : The various non motorized transport modes are efficient in the movement of goods in the study area.
- $H_0$ : The various non motorized transport modes are not efficient in the movement of goods in the study area.

From the information gathered from the respondents at Oja Oba market as presented in Table 4, 5, and 7 shows that Wheel barrow constitute 55% of the non motorized means of transportation in the study area while 75% of the respondent often patronize Non Motorized transport and 85% of the population agrees that non-motorized transport is efficient. To also prove this statistically, factors such as carrying capacity, distance, cost of transportation as presented in Table 4 and 6 were used to analyze its efficiency as presented in Table 7 using chi squared analysis on SPSS. Results were analyzed at 95% confidence at  $p < 0.05$ . Asymptotic significance less than 0.05 is considered positive and favors the argument vice-versa. The tables 8 – 9 below therefore describe the results of the test while Table 10 shows that it is not efficient in terms of speed compared to the speed of motorized transport in the study area.

**Table 8. Test statistics as well as the load capacity**

TEST STATISTICS	LOAD CAPACITY
Chi-Square	7.200
Degree of Freedom	1
Asymptotic Significance	0.007

Table 8 above shows the value of pearsons chi-square one degree of freedom to be 7.200 with Asymptotic significance of 0.007, at p<0.05, which shows that the carriage capacity of non-motorized transport is efficient.

**Table 9.** Test Statistics: Distance Covered

TEST STATISTICS	DISTANCE COVERED
Chi-Square	10.000
Degree of Freedom	3
Asymptotic Significance	0.019

The value of Pearson's chi-square three degree of freedom shown in Table 9 above to be 10.000 with Asymptotic significance of 0.019, at p<0.05, which shows that non motorized transport is efficient in covering the distance within the vicinity of the market.

**Table 10.** Test Statistics: Speed

TEST STATISTICS	SPEED OF NON-MOTORIZED VEHICLE
Chi-Square	4.500
Degree of Freedom	4
Asymptotic Significance	0.343

Source: Field survey 2015

The value of Pearson's chi-square four degree of freedom is shown in Table 10 above to be 4.500 with Asymptotic significance of 0.343, at p>0.05, which shows that the speed of the Non-Motorized Transport means unfavorably not efficient compared to the speed of motorized transport within the market vicinity.

#### 4.2. Data analysis for Isikan market

**Table11.** Age of the respondent

Age	Frequency	%	Valid %	Cumulative %
15-19yrs	30	30.0	30.0	30.0
20-24 yrs	40	40.0	40.0	70.0
25-30 yrs	30	30.0	30.0	100.0
Total	100	100.0	100.0	

Source: Field survey 2015

Table 11 above shows the ages of the respondent at Isikan market

**Table 12.** Sex of the respondent

Sex	Frequency	Percent	Valid Percent	Cumulative Percent
Male	80	80.0	80.0	80.0
Female	20	20.0	20.0	100.0
Total	100	100.0	100.0	

Source: Field survey 2015

Table 12 above shows the sex of the respondent at Isikan market. Eighty percent of the respondents were male while twenty percent were female.

**Table 13.** Qualification of the respondents at Isikan market

Education	Frequency	%	Valid %	Cumulative %
No Education	40	40.0	40.0	40.0
Primary school leaver	30	30.0	30.0	70.0
SSCE Holder	30	30.0	30.0	100.0
Total	100	100.0	100.0	

Source: Field survey 2015

Table 13 above shows the qualification of the respondents at Isikan market. Forty percent of the respondents were illiterate while 60% were literate.

**Table 14.** The level of availability of the various Non-Motorized means of transport

Means	Frequency	Percent	Valid Percent	Cumulative Percent
Push Cart	30	30.0	30.0	30.0
Wheel Barrow	50	50.0	50.0	80.0
Human Porterage	20	20.0	20.0	100.0
Total	100	100.0	100.0	

Source: Field survey, 2015 (Adapted from Table 4)

Table 14 above shows the level of availability of the various Non-Motorized means of transport. It indicated that 50% of the Non-Motorized vehicles were wheel barrow, while the push cart and human porterage have 30% and 20% of the total number of Non-Motorized means in the study area.

Table 15 shows the level of patronage of non-motorize transport 70% of the population at Isikan market often patronized the Non Motorized vehicle while 30% rarely patronized them.

**Table 15.** The level of patronage of non-motorize transport

Level	Frequency	Percent	Valid Percent	Cumulative Percent
Rarely	30	30.0	30.0	30.0
Often	70	70.0	70.0	100.0
Total	100	100.0	100.0	

Source: Field survey 2015

**Table 16.** Price in relation to distance

Distance (M)	Push Cart Charges		Wheel Barrow Charges		Human Poterage Charges	
	Naira	Dollar	Naira	Dollar	Naira	Dollar
50-100	70	0.45	70	0.45	50	0.32
100-200	130	0.83	130	0.83	70	0.45
200-300	150	0.96	150	0.96	100	0.64
300-400	180	1.16	180	1.16	150	0.96
400-500	220	1.41	220	1.41	200	1.28
500 above						

Source: Field survey 2015

Table 16 above Shows that the price charged by the various Non- Motorized mode is directly proportional to the distance covered.

**Table 17.** The efficiency of non motorized transport in the movement of goods

Response	Frequency	%	Valid %	Cumulative %
No	20	20.0	20.0	20.0
Yes	80	80.0	80.0	100.0
Total	100	100.0	100.0	

Table 17 above shows the efficiency of non motorized transport in the movement of goods in the study area. 80% agreed that it is efficient while 20% shows that it is not efficient.

#### 4.3. Discussion

From the information gathered from the respondents at Isikan market, 80% of the population agrees that non-motorized transport is efficient. To prove this statistically, factors such as carrying capacity distance, cost of transportation were used to analyze its efficiency using the chi square Analysis on SPSS. Results were analyzed at 95% confidence at  $p < 0.05$ , Asymptotic significance less than 0.05 is considered positive and favors the argument vice-versa.

**Table 18.** Test statistics for capacity of load

TEST STATISTICS	LOAD CAPACITY
Chi-Square	9.800
degree of freedom	2
Asymptotic Significance	0.007

Table 18 describes the results of the test. It shows the test statistics for the capacity of the loads carried by the non motorized transport in the study area. The value of pearson Chi-square two degree of freedom is shown to be 9.800 with Asymptotic significance of 0.007 at  $p<0.05$ , which shows that the Non – Motorized transport is efficient in terms of carriage capacity. It is pertinent that the level of activities and performance of Non – Motorized transport in the study area could adequately handle or support the movement of goods in the study area.

#### 4.4. Result of the analysis

In view of the aims and objectives earlier discussed, the following was observed using SPSS, it was observed that there is relationship between the efficiency and weight of load, price, distance transport. Chi-square analysis shows that the various means are efficient for the transportation of goods in the market areas. Therefore, the hypothesis,  $H_1$  Non-motorize transport is efficient in transportation of goods is accepted. But it was revealed in the analysis that the Non Motorized transport is not efficient in terms of speed when compared with motorized transport. There is the need to increase the propulsion of the Non Motorized transport in the study area so as to ameliorate the suffering encountered by the operators. In the light of the above discovery there is the need for the introduction of the Cycle Rickshaw as practiced in China.

### 5. Summary of findings

This research work was aimed at identifying the non-motorized transport in the study area, the services of the non-motorized transport and the efficiencies of non-motorized transport for the transportation of goods. It was observed that the non-motorized transportation is very vital to the movement of goods in the market. It is economically cheap, fast when in traffic congestion and also environmentally friendly. It is a means that is worth using among other means. Finally, a well designed questionnaire was used to collect relevant data. The data collected was analyzed using chi-square( $X^2$ ).

#### 5.1. Conclusion

The efficiency of non-motorized transport in transporting goods is dependent on speed, price, weight of load carried and distance that can be covered. The study identified three major types of Non-Motorized Transport commonly used in the study area for the movement of market wares they are: Human portage, Wheel

Barrow, and Pushcart. Wheel barrow is the most widely used in the study area, 80% of the users prefers it to other vehicle. The freight load/capacity of non-motorized transport ranges between 50kg and 500kg. It was also gathered that, the non-motorized vehicle are flexible and adaptable and could carry almost all products marketed in the markets. The carrying capacity is also good and the prices levied on customers are cheap. The perception of the traders on reasons for the use of non-motorized transport in the study area varies, 80% of the traders prefer the non-motorized transport to motorized vehicle because of its flexibility and relatively fast especially when the road network is congested.

## 5.2. Recommendation

Base on the research carried out in the study area the government should invest extensively on non-motorized transportation by provision of infrastructures, terminals and financial aids to the operators of the non-motorized means. Non-motorized paths or roads should be included in planning of the cities and towns. They should also imbibe the use of Cycle Rickshaw to help improve the services provided by this means.

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