

Performance Analysis of Technical Palm Oil Marketing in Ondo and Ekiti States Nigeria

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Abstract: Nigeria has fallen from being the world's leading producer and exporter of palm oil in 1960's to being a net importer of the produce for both food and industrial uses. The produce is marketed throughout the year and the domestic food market focuses on technical palm oil (TPO) which is consumed by households and commercial enterprises. The study looked at the performance analysis of technical palm oil marketing in Ondo and Ekiti State, Nigeria. A multistage random sampling method was employed to select 180 marketers of TPO in the study area. Analytical tools used include, descriptive statistics, gross margin analysis, Shepherd Futrel model and regression analysis. The results showed that 54.45 percent of the marketers were below 41 years of age while the mean age was 40 years. Most (98.33%) of the marketers were women while 76.67 percent were married. The majority (86.11%) were able to acquire formal education while just 12.22 percent had access to various forms of loan. Also, 90.56 percent of the marketers believed that storage materials were inadequate. The level of marketing experience (mean = 8 years) in the study area was low. The majority (90.56%) of the marketers were members of cooperative societies while 70 percent used family labour. In addition, 67.22 percent started and ran the business with their personal capital. Most (68.33%) operated as retailers while 80.56 percent of the marketers got their supplies from the processors of TPO directly. Gross margin analysis revealed that the business was profitable while coefficient of marketing efficiency of 37.46% indicated efficiency use of resources. The main constraints to the business were high transportation cost/bad road, lack of capital and price fluctuation. The main determinants of profitability were age, educational level, marketing experience, access to loan, cooperative society membership and road condition. It is recommended that in order to solve problem of lack of capital, financial institutions should be coerced by government to give marketers loan at one digit interest rate.

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Introduction

Palm oil is an edible vegetable oil derived from the mesocarp of the oil tree crop called oil palm (Reeves and Weihrauch, 1979). Due to high beta-carotene content, palm oil is naturally reddish in colour (Poku, 2002). This product is one of the highly saturated vegetable fats and at room temperature, it is semisolid in nature (Behrman and Gopalan, 2005).

In most developing countries, Nigeria inclusive, there has been limited transformation and uses of palm oil for either food or non food applications. Generally, palm oil is used in the manufacturing industries for non food products such as: cosmetics and personal care, soaps, candles, pharmaceuticals, lubrications and grease, surfactants, industrial chemicals, agrochemicals, coatings, paints and lacquers, biodiesel and leather. Also, it is used in a wide variety of food products such as: cooking oil, deep frying oils, margarines and spreads, bakery fats, cocoa butter alternative fats, confectionary fats, ice cream fats and infants' nutrition fats. When compared to other vegetable oils, palm oil is balanced oil with a unique

chemical composition and it has a longer shelf life as it does not become rancid easily.

In addition, palm oil is one of the major oils and fats marketed globally. It is the highest consumed oil in the world reaching three billion people in 150 countries in 2012. China is the largest consumer of oils and fats followed by the European Union, India, and the United States (Oil World, 2013). As early as 1901, Nigeria was producing all palm oil sold in the world market (Adetola, 2015). In the 1950s and 1960s, Nigeria was known as a leader in the world palm oil market. This fortune changed adversely as a result of the discovery of crude petroleum deposit, excessive tapping of palm tree for palm wine, over reliance on traditional palm oil processing methods, and the effects of Nigerian civil war which was fought in areas where palm activities were predominant. This leadership position was lost to Malaysia and Indonesia. Today, Nigeria is a net importer of palm oil for both household consumption and industrial uses.

Moreover, for international trade, palm oil is graded and defined by 17 characteristics. Prominent

among them are the level of free fatty acid (FFA), followed by dirt, iodine value and other contaminants. Palm oil with less than 5 percent FFA is classified as high quality Special Palm Oil (SPO) which can be consumed or used for industrial purposes while oil with over 5 percent level of FFA is regarded as low quality Technical Palm Oil (TPO) and is mainly used for food consumption. Palm oil marketing especially the TPO remains as an occupation in many communities in Southwest Nigeria. It involves thousands of unskilled and semi skilled people. It provides income for many poor marketers and their dependents. This shows that efficient palm oil marketing in Nigeria will assist the poor to be part of the solution to poverty challenging them through provision of employment and a means of livelihood. As demonstrated in other economies, improvement in the marketing of palm oil can effectively mitigate the poverty level in most rural and urban communities where the produce is being sold. To this end, the study intend to: look at the socio-economic characteristics of the marketers of Technical Palm Oil in the study area; examine the profitability of the business; verify the constraints to the business and determine the factors influencing its profitability.

Materials and method

Study area

The study was carried out in Ondo and Ekiti States located in Southwest Geopolitical Zone of Nigeria. Ondo State was one of the States created from the old Western Region. It was carved out on 3rd February, 1976, while Ekiti State was carved out of Ondo State on 1st October, 1996. The population of Ondo State is 3,441,024 and that of Ekiti State is 2,384,212 making a total of 5,825,236 people (NPC, 2015).

Ondo State lies between latitude 5^o45¹ and 8^o15¹ North of the equator and 4^o 30¹ and 6^o0¹ East of the Greenwich meridian, while Ekiti lies between latitude 7^o25¹ and 8^o5¹N and between longitude 4^o45¹ and 5^o46¹. Ondo State is bounded in the North by Ekiti State in the east by Edo and Delta in the west by Ogun and Osun States and in the south by Atlantic Ocean, while Ekiti State was bounded in north/east by Kogi, north/west by Kwara, and south by Ondo State. The study area composed of rugged hills and low lands; it has two distinct seasons, these are dry season (November-March) and rainy season (April-October); and annual temperature ranges from 20-30^oC with high humidity. The major occupation of the people is agriculture while crops grown in the area are yams, maize, cocoa, oil palm, rice, etc. The major language of communication is Yoruba.

Data collection method

In the study, a multistage random sampling method was employed. At the first stage, based on the population of each State, four and five Local Governments Areas (LGAs) were randomly selected from Ekiti and Ondo States respectively. The second stage involved the selection of two communities from each of the nine LGAs selected while at the last stage, randomly, ten marketers of TPO were selected from the main market of each community to make a total of 180 respondents. Information on marketing activities and socio-economics characteristics were retrieved from the respondents with the aid of a structured questionnaire.

Method of data analysis

Descriptive statistics such as frequency, percentages, and means were used to describe the socio-economic characteristics of the marketers and the constraints facing the business while gross margin analysis was used to determine the gross margin, and Shepherd Futrel Model was employed to investigate the marketing efficiency of the business. The gross margin analysis is represented as:

$$GM = \sum_{i=1}^N P_i Q_i - \sum_{j=1}^M C_j Z_j \dots \dots \dots (1)$$

Where;

GM = Gross Margin.

P_i = Market unit price of output i.

Q_i = Quantity of output i.

C_j = Unit cost of the variable input j.

Z_j = Quantity of variable input j used.

N = Number of output sold.

M = Number of variable input used.

The Shepherd Futrel Model is shown as:

$$CME = \frac{TC}{TR} \times 100 \dots \dots \dots (2)$$

Where CME = Coefficient of marketing efficiency

TC = Total cost of marketing

TR = Total revenue from Marketing

In order to verify the factors militating against marketing of technical palm oil in the study area, marketers were asked to indicate the severity of each constraint identified through literature and Focus Group Discussions (FGDs). Three – point rating scale was used. Nominal values were assigned to the points as follows: Not serious=1, serious=2 and very serious=3. The constraints were ranked based on the computed mean scores.

Also regression analysis was adopted in determining the factors affecting the profitability of technical palm oil marketing. Three functional forms (linear, semi log and log log) were tried and the best selected based on econometric, economic and statistical criteria. The ordinary Least Square (OLS)

technique was employed in obtaining the numerical estimates of the coefficients of the equations. The

functional forms are stated explicitly as:

$$GM_i = \Delta_0 + \Delta_1 AG + \Delta_2 EL + \Delta_3 ME + \Delta_4 MS + \Delta_5 AL + \Delta_6 MC + \Delta_7 HS + \Delta_8 RC + \Delta_9 ML + e_i \dots \dots (3) \text{ Linear}$$

$$GM_i = \Delta_0 + \Delta_1 \ln AG + \Delta_2 \ln EL + \Delta_3 \ln ME + \Delta_4 \ln MS + \Delta_5 \ln AL + \Delta_6 \ln MC + \Delta_7 \ln HS + \Delta_8 \ln RC + \Delta_9 \ln ML + e_i \dots \dots (4) \text{ Semi Log}$$

$$\ln GM_i = \Delta_0 + \Delta_1 \ln AG + \Delta_2 \ln EL + \Delta_3 \ln ME + \Delta_4 \ln MS + \Delta_5 \ln AL + \Delta_6 \ln MC + \Delta_7 \ln HS + \Delta_8 \ln RC + \Delta_9 \ln ML + e_i \dots \dots (5) \text{ Log log}$$

Where:

GM = Gross Margin (Naira)

AG = Age of Marketer (Year)

EL = Educational Level (Year)

ME = Marketing Experience (Year)

MS = Marital Status (married=1, others=0)

AL = Access to Loan (access=1, no access=0)

CM = Cooperative Society Membership (member=1, non member=0)

HS = Household Size (number)

RC = Road Condition (good=1, bad=0)

ML = Market Levy (Naira)

e_i = error term

\ln = Natural logarithm

$\Delta_0 - \Delta_9$ parameters to be estimated.

Results and Discussion

Table 1 reveals that 54.45 percent (majority) were below 41 years of age while 45.55 percent were 41 years and above. The minimum and maximum ages were 22 and 69 years respectively while the mean age was 40 years. This shows that marketers of palm oil in the study area belong to the active segment of the population and will have the energy required to travel from one place to another in search of the produce. This corroborates the work of Ibitoye (2014) that palm oil marketers belong to the active and productive group of the population of any society.

Also, Table 1 indicates that most (98.33%) of the marketers were women while just 1.67 percent were men. This implies that marketing of this product is done mainly by women in the study area. This is in line with the findings of Nwauwa (2010) that women constitute the majority in marketing of palm oil in most of the rural markets. The dominance of the women in the palm oil marketing activities might be due to the fact that small capital can be used to start the business.

Moreover, 76.67 percent of the respondents were married while 17.78 percent were single. Also, 3.33 percent and 2.22 percent were widowed and divorced respectively. This implies that the time, energy, and resources of most of the marketers are shared between the business and their immediate family.

Furthermore, according to table 1 only 13.89 percent (minority) of the marketers did not have formal education while the majority (86.11%) were able to acquire formal education. The result indicates high level of literacy among the marketers. This implies that most of the marketers can read and document some of their marketing transactions. Documentation allows one to keep vital information which enhances the marketing and productivity efficiency. This corroborates the findings of Anden, Aniedi and Okon (2015) that most bitter kola marketers are formally educated.

Table 1, reveals that the majority (87.78%) of the marketers had no access to any form of loan while just 12.22 percent had access to various forms of loan. This implies that the marketer will have access to limited capital and this will affect the scale of operation negatively. Since processing of palm oil is seasonal, limited liters of the product would be purchased for resale by the marketers. This could lead to vicious cycle of low capital, low output and low income among the marketers. Also, 90.56 percent of the marketers believed that storage materials were inadequate while just 9.44 percent said the materials were adequate. This means that the litres of oil to be bought and stored by the marketers would be limited.

Experience matters a lot in marketing of palm oil because it is through this that one can know when and where to buy, when to store, and when and where to sell at reasonable price. Distribution of respondents by marketing experience in Table 1 shows that 72.23 percent of marketers had between 6 and 15 years marketing experience, while 13.33 percent marketers had less than 6 years experience in buying and selling of palm oil in the study area. Also, 14.44 percent had above 15 years experience. The minimum and maximum were 1 and 30 years respectively, while the mean was 8 years. This shows that the level of marketing experience in the study area is low.

Table 1 reveals that, the majority (90.56%) of the marketers were members of cooperative societies. These societies do assist members a times to source for loans and market information needed to boost marketing activities. This implies that most of the marketers would have access to necessary information.

Table 1: Socio-economic Characteristics of Respondents

Variable	Frequency	Percentage
Age		
≤30	28	15.56
31-40	70	38.89
41-50	60	33.33
51-60	14	7.78
>60	8	4.44
Gender		
Male	177	98.33
Female	3	1.67
Marital status		
Single	32	17.78
Married	138	76.67
Widowed	6	3.33
Divorced	4	2.22
Educational level		
No formal education	25	13.89
Primary	70	38.89
Secondary	83	46.11
tertiary	2	1.11
Access to loan		
Yes	22	12.22
No	158	87.78
Storage material adequacy		
Adequate	17	9.44
Inadequate	163	90.56
Marketing experience		
≤5	24	13.33
6-10	83	46.12
11-15	47	26.11
>15	26	14.44
Cooperative society membership		
Yes	163	90.56
No	17	9.44
Sources of labour		
Hired	12	6.67
Family	126	70
Hired & family	42	23.33
Source of capital		
Personal capital	121	67.22
Family & friends	30	16.67
Cooperative societies	21	11.67
Banks	8	4.44
Selling mode		
Retailing	123	68.33
wholesaling	28	15.56
Both	29	16.11
Source of supply		
Processors	145	80.56
Middlemen	20	11.11
Both	15	8.33
Mode of marketing		
Full time	149	82.78
Part time	31	17.22
Storage equipment		
Tank	23	12.78
Jerry can	152	84.44
Drum	5	2.78

Most (70%) of the respondents used family labour while 6.67 percent used hired labour for marketing of palm oil. This is an indication that most of them still operate on small scale. Source of capital shows that the majority, 67.22 percent, started and ran the marketing activities with their personal capital while 32.78 percent ran the business with capital obtained from family and friends, cooperative societies and banks. This is an indication again that the marketers are faced with the problem of limited capital.

Moreover, selling mode in Table 1 shows that 68.33 percent operated as retailers while just few (15.56%) were wholesalers. This implies that the scale of operation of marketers in the study area is small. This may be due to the fact that retail business has flexible market function and requires little capital to start. Also, 80.56 percent of the marketers got their supplies from the processors directly while 11.11 percent patronized the middlemen. This implies that more profit would be realized by the marketers because it is cheaper to purchase from the processors than the middlemen.

Table 1 indicates that the majority (82.78%) were into the business full time while those on part basis were 17.22 percent. This implies that most of the marketers would have enough time for the business and hence be able to improve on the mode of operation with time. Distribution by the type of storage equipment used shows that, the majority (84.44%) used jerry cans especially the 25litres kegs to purchase and sell palm oil while few (15.56%) used tanks and drums. This is different from what Akangbe et al., (2011) found in Oyo State that most of the palm oil marketers do store the product in drums.

Table 2 shows the costs and returns of marketing technical palm oil in the study area. Purchases and sales of the product were done mostly in jerry cans especially, the 25litres, 20litres, 10litres, 5litres, 4litres and 1litre kegs. The average price per litre over the year under consideration was ₦200 for purchase while for sale was ₦610. A total of 657,000litres of palm oil were traded with while the transportation costs gulped ₦7,884,000. Also loading and offloading costs were ₦1,102,300 and ₦1,000,100 respectively.

Table 2: Profitability Analysis of Technical Palm Oil Marketing

S/NO	ITEM	TOTAL AMOUNT (₦)
A	Revenue	400,770,000
B	Variable costs	
	Purchasing cost (657,000 litres)	131,400,000
	Transportation cost	7,884,000
	Loading cost for purchase and sale	1,102,300
	Offloading cost for purchase and sale	1,000,100
	Other costs	500,000
	Total variable cost	141,886,400
C	Gross margin (A-B)	258,883,600
D	Fixed costs	
	Depreciation on kegs and other materials	3,929,211
	Storage cost/Rent	4,320,000
	Total fixed cost	8,249,211
E	Total costs (B+D)	150,135,211
F	Profit (A-E)	250,634,389
G	Coefficient of marketing efficiency	37.46%

Computed from field survey, 2016

Other variable costs amounted to ₦500,000. Total revenue was ₦400,770,000. The gross margin for the marketers was ₦258,883,600 while the total fixed cost was ₦8,249,211. The profit was ₦250,634,389. This implies that the business is profitable in the study area. Official exchange rate as at 2016 was \$1 to ₦305. This research corroborates the work of Ibitoye (2014) who found that palm oil marketing is profitable.

Also table 2 records 37.46 percent for the coefficient of marketing efficiency. It indicates that 37.46 percent of sales revenue of the marketers was taken up by costs. The coefficient shows the productivity of the resources invested in the marketing process. The lower the coefficient, the higher the level of efficiency. The result implies that marketing of technical palm oil in the study area is done efficiently.

Table 3: Constraints to Technical Palm Oil Marketing

S/NO	Constraint	Mean	Rank
1	High transportation cost/ Bad road	0.98	1 st
2	Inadequate storage facilities	0.86	5 th
3	Price fluctuation	0.94	3 rd
4	Seasonality of the product	0.89	4 th
5	Lack of capital	0.95	2 nd
6	Poor marketing channels	0.62	7 th
7	Poor patronage	0.73	6 th
8	High market levy	0.59	8 th
9	Poor market information	0.47	9 th

Table 3 reveals the constraints to marketing of technical palm oil. It shows that the most severe problem facing palm oil marketing in the study area was high transportation cost/bad roads with the mean of 0.98 and it was ranked first followed by lack of capital (mean= 0.95) and price fluctuation(mean= 0.94). Those problems that were not severe include poor market information, high market levy and poor marketing channels. Other problems were seasonality

of the product, inadequate storage facilities, and poor patronage.

The linear equation model was chosen as lead equation based on (i) the magnitude of R^2 (ii) the number of variable that are significant and (iii) the appropriateness of the sign on the coefficients. The results for the marketing function are presented in table 4.

Table 4: Regression Estimates of Marketing Function for Technical Palm Oil

Variable	Functional form		
	Linear	Semi- log	Log- log
Age of marketer (AG)	-0.0106(0.0051)**	0.1361(0.0694)	-0.0058 (0.0116)
Educational level (EL)	0.5310 (0.2668)**	-0.0156 (0.0104)	0.1846 (0.0769)**
Marketing experience (ME)	0.1954 (0.0488)***	0.3531 (0.1471)**	0.3756 (0.1976)*
Marital status (MS)	-0.0230 (0.0153)	-0.6211 (0.5175)	0.6871 (0.3674)*
Access to loan (AL)	0.0163 (0.0082)**	0.3419 (0.4273)	-0.2258 (0.4516)
Cooperative society membership (CM)	0.0611 (0.0244)**	-0.5513 (0.3603)	-0.6510 (0.3444)*
Household size (HS)	0.0793 (0.1416)	-0.0392 (0.0223)*	0.7732 (0.6255)
Road condition (RC)	0.2417 (0.1007)**	0.0891 (0.1782)	0.0951 (0.0606)
Market levy (ML)	-2.3140 (2.5711)	-0.1897 (0.1459)	0.5876 (0.6039)
Constant	-4.3561 (0.7770)***	0.3460 (0.6167)	0.0873 (0.0955)
R^2	0.8401	0.5360	0.6215

*** indicates significant at the 1% level, ** at the 5% level and * at the 10% level. Figures in parentheses are the standard error-values. The dependent variable is gross margin.

The R^2 value of 0.84 for the estimated regression model depicts that about 84 percent of the variation in gross margin of the marketers was explained by the explanatory variables included in the model.

Table 4 shows that the age of marketer (AG) had a negative relationship with gross margin and significant at 5 percent level of significance. This implies that as the age of a marketer increases, gross margin from his marketing activities decreases. This may be so because older people may not have the energy and strength to move around in search of the

produce since most of the marketers' source for the produce from the processors that are scattered in the study.

In addition, in Table 4, educational level of the respondents was significantly (5%) and positively correlated to gross margin. This implies that as the number of years spent in school increases the gross margin also increases and vice versa. It has been argued that education enhances performance. Adoption of new innovations that promotes marketing activities may be encouraged by the number of years

spent in school. Marketing experience was significant at 1 percent level of significance. It was positively related to the gross margin. This signifies that gross margin increases as marketing experience increases. This is in line with the adage that says experience is the best teacher. Knowledge on marketing activities gathered over the years is useful in boosting the marketers' income. Access to loan was significant (5%) and positively related to gross margin. This is an indication that accessibility to loan leads to a better gross margin. Availability of Loan is very important to the marketers because most of the time, purchases of the product for sale are done during the peak season while sales are carried out during the off season.

According to Table 4 cooperative society membership was positive and significant at 5 percent level of significance. It shows that those that are members of cooperative societies are more likely to generate a better gross margin than their counterparts (non members). Also, road condition played a significant role on the gross margin of marketers. It is significantly (5%) and positively correlated to the gross margin. This implies that good road ease transportation of the produce and also allows generation of more profit since less transportation cost will be incurred.

Conclusion and Recommendations

Palm oil is one of the most widely consumed vegetable oil in the world and it is almost about half of all packaged products sold in our various supermarkets. Nigeria was regarded as the world leading producer and marketer of palm oil at independence but today this position has been taken over by other countries. Today in Nigeria, palm oil marketing remains the main occupation of thousand of people. Hence, the need to investigate the performance of the business.

Socio-economics characteristics and constraints to marketing of technical palm oil were examined by descriptive statistics, while the profitability and marketing efficiency of the business were determined by gross margin analysis and shepherd futrel model respectively. Also, factors influencing the profitability of the business were determined by regression analysis.

The study revealed that the marketers of technical palm oil belong to an active segment of the population. They are mostly married women with the majority having formal education. Also, most of the marketers have no access to loan and they operate with inadequate storage facilities. Their level of marketing experience is low and they are mostly members of cooperative societies. The use of family labour is prominent among the marketers. Personal capital is the

main source of capital and the majority sell the product at retail level. Most of the marketers do purchase the product for sale directly from the processors. Distribution of the product is done mostly in jerry cans which are of different sizes.

Gross margin analysis showed that the business is profitable while the coefficient of marketing efficiency indicated that marketing is done efficiently. The main constraints to the business are high transportation cost/bad road, lack of capital and price fluctuation. Profitability of the business is determined by age of marketer, educational level, marketing experience, access to loan, cooperative society membership and road condition.

Based on the findings of this study and in order to boost marketing of technical palm oil in the study area, the following recommendations are proffered:

- Good road networks should be constructed by government in order to reduce marketers' transportation cost to and from where the product is being purchased.

- In order to solve problem of lack of capital, financial institutions should be coerced by government to give marketers loan at one digit interest rate. Also, government should empower the marketers' through their cooperative societies.

- Good modern storage facilities should be subsidized and provided by government. This will reduce the business marketing cost.

- Price fluctuation problem could be solved, if government at different levels of marketing activities fixes prices.

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