

Profitability Analysis of Smoked Fish Marketing in Ilaje Local Government Area of Ondo State, Nigeria

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Abstract: This paper assessed the profitability of smoked fish marketing in Ilaje Local Government Area of Ondo State. A multi-stage random sampling procedure was used to select one hundred and twenty (120) respondents using a well-structured questionnaire. Descriptive statistics, gross margin analysis, benefit-cost ratio and production function using an ordinary least square method were employed to analyse the field survey data. The results showed that on average, majority of the marketers were around 40 years of age. Many (90.0%) of the traders were female household heads with 14 years of marketing experience. The result revealed that 80% of the respondents were educated with a mean household size of 9 persons. The total cost and revenue were ₦64,808.0 and ₦125,000.0 per month, respectively, while the gross margin and net income for the sales of 50kg of smoked fish were ₦63,641.97 and ₦60,191.97, respectively per month. The profitability of selling smoked fish was positively and significantly impacted by household size, fish marketing experience and educational status of respondents who attained secondary school education at the 1% level. The study also found that gender, age of the respondent, cost of transportation and miscellaneous operating cost of smoked fish marketing had a negative influence on their net margin. Based on these findings, it is recommended that policies that will increase the level of education and participation of young people in fish trading should be encouraged and factored into policies related to fish production and marketing.

Keywords: Smoked Fish, Marketing, Profitability, Ondo State

1. Introduction

Fish production constitutes about 40.0% of the total animal protein intake in the food of average Nigerian [6, 23]. Nigeria population required about 2.7 million metric tons of fish annually to satisfy their dietary needs. However, the total aggregate domestic fish supply from all sources (capture and culture fisheries) is about 0.8 million metric tons per annum thereby creating a deficit of 1.9 million tons to fill the supply gap [10]. Consequently, Nigeria spends about \$1.2 billion on fish importation annually to balance the shortfall [13]. Nigeria is the largest importer of frozen fish in Africa, despite the fact that it has a coastline of 853km [8].

Nigerian agriculture employed 36.5% of the total labour force in 2017 [28]. In the fisheries subsector, about 1,190.5 million people were employed in Nigeria [15]. Fishing is an

important component of agriculture that occupies a prominent place in Nigerian economy, adding about 0.5% to the total gross domestic product (GDP) in 2015 [14]. However, poverty and unemployment are global phenomena causing serious harms to the life of people, though severity varies from country to country. Nigeria's unemployment rate continues to increase by 13.4% higher than the global average level of 7.9% in 2017 [9].

To address these challenges, a number of programmes have been initiated by the Nigerian governments at the Federal, State and Local levels to alleviate poverty and solve problem of unemployment in the country. Few of these programmes include Fadama, National Poverty Eradication Programme (NAPEP), N-Power, National Directorate of Employment (NDE), Better life programme (BLP), Family support programme (FSP), Family Economic Advancement Programme (FEAP) and Tadermoni. Majority of these

programmes in one way or the other were linked to agriculture as a veritable instrument for poverty alleviation because agriculture is the major employer of labour as far as Nigerian economy is concerned. None of these programmes initiated so far have seemed to yield the desired results either because the programmes were built on a faulty foundation (information) or some other hidden factors constrained their proper implementations.

There are a number of employment opportunities along the fish value chain of which the most prominent include production, processing, distribution and marketing. Marketing is an economic process by which goods and services are exchanged between the producers and the consumers and their values are determined by money prices [25]. Fish marketing, therefore, involves purchasing and moving of the products to the final consumers. It also involves the possession of fish through purchasing, assembling, storing, grading, standardizing, processing, sales promotion, transporting and selling them to the final consumers. The role of middlemen cannot be overemphasized in smoked fish marketing. Due to an increased need of protein, food security and employment, fish business holds promising potentials for investors [23].

Available literature reviewed show that several studies have been conducted on the economic analysis of smoked fish marketing for decades [e.g 1-4, 7, 17, 19, 20, 23]. However, factors affecting the profitability of smoked fish marketing have not been adequately researched in the study area. Though, we found few studies like Agbebi [5] and Fapohunda [12] that worked on economic analysis of smoked fish marketing in the study area. But, the coverage of their studies was limited to one community each compared to the present study. Based on this information, this study was, therefore, conceptualized to update the knowledge gap observed in the previous studies. To achieve our specific objectives, the study is sought to provide answers to the following research questions. (a) What are the socio-economic characteristics of smoked fish marketers in the study area? (b) Is smoked fish marketing profitable in the study area? (c) What are the factors affecting profitability of smoked fish marketing? (d) What are the constraints faced by smoked fish marketers?

The main objective of this study was to investigate the profitability of smoked fish marketing in Ondo State, Nigeria with specific objectives to examine the socioeconomic characteristics of smoked fish marketers; compute the profitability of smoked fish marketing in the study area; analyze factors influencing the profitability of smoked fish marketing; and identify constraints facing smoked fish marketing in the study area. The outcome of this study was expected to provide key information for policy makers, fish producers, marketers and researchers.

2. Methods

2.1. Study Area

The study was conducted in four communities of Ilaje

Local Government Area (LGA) of Ondo State. Ilaje LGA is one of the eighteen (18) LGAs of the State located along the coastal belt of Ondo, Ogun, Lagos and Delta states and thus giving the communities in the LGA a comparative advantage to engage in fish production, processing and marketing. It has a land area of 1,318km² with a population of 290,615 [18].

Primary data were collected for the study from fish marketers. Multi stage random sampling procedure was used to select smoke fish marketers. In the first stage, Ilaje LGA was purposively chosen from the 18 LGAs of the State being a riverine area. In the second stage, four communities that are highly prominent in fishing, processing, distribution and marketing of fish in the study area were purposively selected. The communities selected were Ipore, Ugbonla, Makun and Igbokoda. The third stage involved a random selection of thirty (30) respondents from each of the communities, giving a total of one hundred and twenty (120) respondents selected for this study. The information on socio-economic characteristics of smoked fish marketers was retrieved using a well-structured questionnaire which was pre-tested in one of the communities which was not selected as part of our study area. After pre testing and validating, the questionnaires were finally administered by trained enumerators.

2.2. Data Estimation

This study used both descriptive and inferential statistics to analyze field survey data. Gross margin analysis was used to compute cost and returns of smoked fish marketing while an ordinary least square regression was used to obtain the estimates of the parameters of the factors affecting the net margin of fish marketers.

2.2.1. Gross Margin Analysis

Gross margin analysis is an economic tool basically employed to evaluate the performance of enterprises by simply deducting the total variable cost from the total revenue. The gross margin of i^{th} marketer was represented as;

$$GM_i = TR_i - TVC_i \quad (1)$$

$$NM_i = TR_i - TC_i \quad (2)$$

Where, GM_i =gross margin accrued to i^{th} fish marketer,
 NM = net margin accrued to i^{th} fish marketer,
 TR_i =Total revenue accrued to i^{th} fish marketer,
 TVC_i =Total variable cost incurred by i^{th} fish marketer.

2.2.2. Profitability Index

The following profitability considered in this study include

$$\text{Gross ratio} = \frac{\text{Total Cost}_i}{\text{Total Revenue}_i} \quad (3)$$

$$\text{Benefit - Cost Ratio} = \frac{\sum_{i=1}^{n_i} \frac{B_i}{(1+r)^n}}{\sum_{i=1}^{n_i} \frac{C_i}{(1+r)^n}} \quad (4)$$

Where B_i = Discounted benefit, C_i = Discounted cost, r = rate in %, n_i = number of year and \sum = summation.

2.2.3. Multiple Regression Analysis

Following Gujarati [16] multiple regressions analysis using ordinary least square method was employed to identify the key determinants of net margin accrued to fish marketers. The implicit form of the model is postulated as

$$Y_i = f(\beta_i X_i, U_i) \quad (5)$$

Where,

Y_i = net margin of smoked fish marketer i^{th}

F_i = functional relationship

X_i 's = vectors of explanatory variables

β_i 's = vectors of estimated parameters

U_i = error term

Table 1 presents all the independent variables used in equation 5. We tried four (4) different functional forms of production function viz; Linear, Semi-log, Double-log and Exponential production functions. Data collected were analyzed using STATA version 14 [26].

Table 1. Description, Measurement of Variables and Hypothesized effects.

Code	Variable	Description & measurement of variables	Hypothesized effect
X1	GENDER	Male=1, 0 otherwise	+/-
X2	MARITAL STATUS	Married =1, 0 otherwise	+/-
X3	AGE	in Years	-
X4	EXPERIENCE	Years of fish marketing experience	+
X5	SELLING PRICE	₦/kg	+
X6	TRANSPORTATION COST	Total Kilometre travelled in naira	-
X7	MISCELLANEOUS EXPENSES	Expenses on tax, phone calls, etc in naira	-
X8	HOUSEHOLD SIZE	Number of family members	+/-
X9	PRIMARY EDUCATION	If completed primary school =1, 0 otherwise	+
X10	SECONDARY EDUCATION	If completed Secondary school =1, 0 otherwise	+
X11	TERTIARY EDUCATION	If completed Tertiary school =1, 0 otherwise	+
X12	MEMBER OF COOPERATIVES	If s/he belongs to cooperatives =1, 0 otherwise	+

3. Results and Discussion

3.1. Summary of Descriptive Statistics

Socio-economic characteristics of the respondents are presented in Table 2. The mean age of the respondents was 40 years. The age structure here implies that the respondents are still economically active. Majority (90.0%) of the respondents were females, implying that female traders are major players in smoked fish business. This finding is in line with a study conducted by Bukenya [7] and Agbebi and Adetuwo [5], who also found that women dominated smoked fish marketing in Uganda and Nigeria, respectively. The fish marketer had a mean household size of about 9 members with a standard deviation of 3.7.

Table 2. Descriptive statistics of continuous and nominal variables ($n = 120$).

Variable	Mean	SD.	Min.	Max.
Age	39.6	12.8	25	75
Marital status	1.8	0.4	0	1
Gender	1.9	0.3	0	1
Household size	8.5	3.6	1	20
Marketing experience	14.3	10.8	3	45
Transport cost	12,343.8	496.1	1,000	30,000
cooperatives	0.4	0.055	0	1
Educational status	1.4	1.09	0	3

Source: Field survey, 2021

The result revealed that majority (80%) of the marketers were educated and just 20% of the respondents had no formal education. High education among the respondents suggests that marketers in the study area are likely to possess a good managerial skill, particularly in the area of decision making.

The years of marketing experience showed that respondents had been in the business for more than a decade. They have spent about 14 years so far in the business and this must have contributed significantly to their profit. This implies that smoked fish marketers are highly experienced in the business. The mean transport cost was high as ₦12,343.8 per month. This may have a negative implication on the profit of fish marketers. About 60% of the marketers were not in any form of cooperatives in the study area which suggested that majority of them run their business with personal fund.

3.2. Profitability of Smoked Fish Marketing

Result in Table 3 reveals the percentage distribution of cost and returns on smoked fish sales in the study area. The total cost of selling smoked fish per month incurred was ₦64,808.0. The average cost of fish stocked per month was ₦57,500 representing 88.7% of the total cost while total variable cost was ₦61,358.0 gulping about 94.7% of the total cost incurred in selling smoking fish. Total fixed cost represented by its depreciation was low (5.3%). This, thus, revealed that smoked fish marketers incurred less fixed cost compared to variable cost. The cost of selling smoked fish is dominated by total variable cost. Monthly total revenue accrued to smoked fish marketers, on average, was ₦125,000 with a gross and net margin of ₦63,641.97 and ₦60,191.97, respectively. The result indicates that smoked fish business is a profitable venture. This result agrees with the gross profit of ₦60,000 per month estimated by Agbebi and Adetuwo [5] for fish marketing at Igbokoda. The gross ratio was 0.55, implying that every one naira invested, a profit of 55kobo would be realized by marketers. Similarly, the benefit-cost ratio computed was 1.93 and it is greater than one, implying that smoked fish business is profitable even with the high

interest rate of double digit.

Table 3. Cost and Returns Analysis of Smoked Fish Marketing for 50kg/month.

Variable Items	Mean value (₦/Month)	Percentage
Fish Stocked (50kg)	57,500	88.7
Tax	671.77	1.0
Telephone	200.53	0.3
Package	400.39	0.6
Transport	1350	2.1
Rent Paid on stall	798.23	1.2
Firewood	437.11	0.7
Total Variable Cost (TVC)	61,358.0	94.7
Depreciation	3450	5.3
Total cost	64,808.0	100.0
Smoked Fish Sold		
Total Revenue (TR)	125,000	
Gross Margin: GM = (TR-TVC)	63,641.97	
Net Margin	60,191.97	
Discounted Total Cost @12%	64223.09	
Discounted Total Revenue@12%	123,750.20	
Benefit-Cost Ratio = TR/TC	1.93	
Gross Ratio =TC/TR	0.55	

Source: Field survey, 2021.

3.3. Factors Affecting the Profitability of Smoked Fish Marketing

Results displayed in Table 4 presents the regression results for the factors affecting the profitability of smoked fish business in the study area. Four production functional forms of linear, semi-log, double-log and exponential were estimated and the best functional form that fitted our data was selected. The double-log production function was selected as lead equation on the basis of economic, statistical and econometric criteria. All tests conducted were tenable. The adjusted R^2 was 88.0%, indicating that 88.0% of the total variation in the net profit of smoked fish marketer was explained in the model by all the explanatory variables added to the model while the remaining 12.0% variation was due to error term. The F-value (279.09) showed that all the explanatory variables jointly exerted a significant impact on the level of profit realised in smoked fish marketing at 1% probability level. Further test conducted showed that the variance inflation factor (VIF) computed from the data was 2.64, suggesting that there was no problem of multicollinearity.

In the model, seven variables were statistically significant which included gender, age of the respondent, marketing

experience, household size, cost of transport, miscellaneous expenses incurred and education of the respondent at secondary school level. The result showed that gender had a negative significant impact on the profitability of the fish marketer at the 1% level. This result implies that male fish seller will have their profit reduced by 0.09%, compared to the profit of the female fish seller, holding other factors in the model constant.

The coefficient of age of the marketer was negative and statistically significant at the 1% level. The coefficient of age agrees with our *a priori* expectation that net profit decreases as fish marketer adds a year to her age. The implication is that a unit increase in this variable will produce a proportional decrease of 14% in the profit of fish seller. According to [21, 27], they stated that aged farmers are old-fashioned and slow in taking decision towards technology adoption. Profit also goes up by 36.1%, as smoked fish seller gains an additional year of marketing experience. This result is similar to the findings of [11, 21], who also reported that years of fish marketing experience had a positive influence on the profit of the fish marketer.

Further examination of the result showed that the slope coefficients of the cost of transport and miscellaneous operating cost were negative as expected and statistically significant at the 1% level. The results here comply with our *a priori* expectations. Thus, the result indicates that a 10% change in the transport and miscellaneous operating costs, would generate a net margin of 2.5% and 5.5%, respectively. The results agree with the findings of Omiti [22] that transport cost per kilometre travelled increases with the marketable load size. Hence, it decreases the profit of traders.

The coefficient of household size was consistently positive and significant at the 1% level. The result here agrees with our hypothesis that increase in family size will reduce cost of labour, hence increase in the profit of fish marketers. An additional one member to household size in the study area will increase profit by 58.2%. Large family size provides cheap labour for marketers and thereby reducing laborious work associated with hawking of fish or moving it from a place of low utility to higher utility. Similarly, fish marketer that had her education up to secondary school level would help such farmers to boost her profit by 0.13%. Education provides ability to process information than others as well as reducing the cost of searching and screening of information [24].

Table 4. Regression Results for Profitability Analysis of smoked fish marketers in Ilaje LGA.

Variable	Double-log		Linear		Semi-log	
	Coef.	Robust Sd err	Coef.	Robust Sd err	Coef.	Robust Sd err
Gender	-0.09***	0.02	-3828.36**	1871.72	-5740.98	1364.45
Marital Stat	0.04	0.03	-1823.26	1562.50	-367.27	1500.50
Age	-0.14***	0.04	-102.80	110.93	3032.49	2032.07
Experience	0.36**	0.17	198.70	148.15	-13063.10	7503.79
Selling price per kg	0.43**	0.03	188.70	158.90	1450.01	2043.06
Transportation Cost	-0.25***	0.06	0.01	0.10	840.66	3025.79
Miscellaneous	-0.55***	0.14	0.08	0.09	-20539.10**	7483.31
Household Size	0.58***	0.18	493.61**	188.49	17219.92	10951.43
Primary Education	0.05	0.04	1504.75	1449.62	-2328.39	1750.02
Secondary Education	0.131***	0.04	-82.81	1577.84	315.97	2574.89

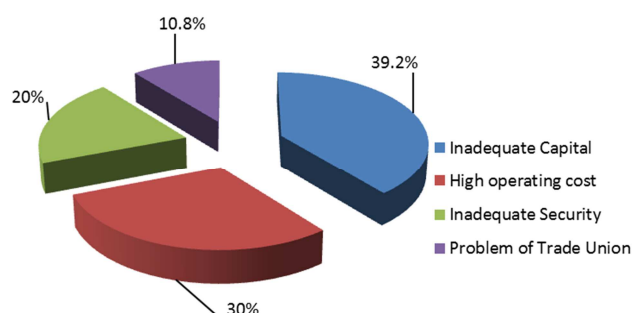
Variable	Double-log		Linear		Semi-log	
	Coef.	Robust Sd err	Coef.	Robust Sd err	Coef.	Robust Sd err
Tertiary Education	0.034	0.04	3555.58	2118.33	-1226.91	1748.41
Cooperatives	0.01	0.02	-129.11	1489.78	2428.27**	1131.64
_Cons.	0.54***	0.18	12583.54**	4916.64	28216.54**	10762.60
Adjusted R Squared	0.88		0.23		0.38	
F-Statistic	279.09		11.55		6.66	
Prob>P	0.00		0.00		0.00	
VIF	2.64		2.37		2.64	
Obs.	120		120		120	

Note: Figures in parenthesis present the t-values. *** Significant at $p < 0.01$, **Significant at $p < 0.05$ and * Significant at $p < 0.10$

Source: Field survey data, 2021

3.4. Constraints Faced by Smoked Fish Marketers

As shown in Figure 1, the distribution of respondents by constraints showed that the problems faced by smoked fish marketers ranged from inadequate finance, high operating cost, inadequate security and victimization by union members. About 39.2% of the respondents surveyed reported that they were constrained by inadequate capital. 25.0% of the respondents reported high operating cost. This is because some of the traders buy and sell their stocks outside the LGA. The respondents also reported an inadequate security on the roads travelled to buy fish and victimization of non-members by fish sellers' association/trade union had a share of 20.0% and 10.8%, respectively.



Source: Field survey, 2021.

Figure 1. Constraints faced by smoked fish marketers.

4. Conclusion

The results of the profitability of smoked fish marketing in Ilaje Local Government Area of Ondo State revealed that the mean age of smoked fish marketers was 40 years. Many (90.0%) of the traders were female. They have spent an average of 14 years of marketing experience with mean household size of 9 members. Total variable cost was about 94.7% of their total cost and they sold an average of ₦125,000 per month as revenue. The study concluded that the gross margin gained from the sales of 50kg of smoked fish was ₦63,641.97 with a net income of ₦60,191.97, respectively in a month.

The study concluded that household size, marketing experience and secondary school education were factors that could add positive value to net profit of fish sellers. On the other hand, gender, age of the respondent, cost of

transportation and miscellaneous operating cost would reduce net margin of smoked fish marketers.

5. Recommendation

Sequel to the findings of this study, the study suggests that policy formulation should be geared towards encouraging the young ones to participate in fish trading as this will go a long way in solving the problems of unemployment.

Furthermore, it is also suggested that training workshop and seminar should be organised for fish marketers in the study area to have better understanding about cost management.

Again, fish marketers in the study area should be given a priority in the provision of soft loan.

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