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PERFORMANCE AND DRIVERS OF FROZEN FOOD MARKETING IN ILORIN METROPOLIS, KWARA STATE

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ABSTRACT

The study focused on performance of frozen food marketing in Ilorin, Kwara State. The list of frozen food marketers in the major markets of Ilorin west and Ilorin south Local Governments Areas of Ilorin metropolis constitutes the sampling frame for this study. Data were obtained via interview schedule from 180 randomly selected respondents and analyzed using Herfindahl index, marketing margin, marketing efficiency analysis, multiple linear regression and multinomial analysis. Results revealed that 67.8% of the frozen food marketers were females, 72.2% were married, 70% were between the ages 21-40 years, 74.4% took frozen food marketing as their primary occupation and 72.8% had 1-10 years of experience. The Herfindahl index values of 0.04, 0.05 and 0.08 for fish, chicken and turkey respectively indicate a highly competitive and non-concentrated frozen foods market. Profit margin of ₦14,959.9, ₦21,882.9 and ₦21,710.9, and marketing efficiency values of 124.34%, 122.81% and 118.74% were obtained for fish, chicken and turkey respectively, indicating profitable and efficient marketing for all the three products. The profit accrued to fish marketing was found to be affected by age of the marketers ($p<0.01$), marketing experience ($p<0.01$), cost of marketing services ($p<0.1$) and selling price ($p<0.01$) while that of chicken was found to be influenced by cost of marketing services ($p<0.05$), education ($p<0.01$), gender ($p<0.01$) and selling price ($p<0.01$). The profitability of frozen turkey was determined by gender ($p<0.05$), cost of marketing services ($p<0.01$) and selling price ($p<0.01$). The result of multinomial shows that the likelihood of choosing chicken and turkey enterprises over fish enterprise was significantly determined by age, cost of frozen products and marketing experience. Since frozen food business operates in a free competitive market, more investors are encouraged to venture into the business to enhance more employment.

Keywords: Competitive; frozen foods; marketing efficiency; performance

INTRODUCTION

Frozen foods are food items that are stored fresh in freezers at a temperature usually below -18ºc to extend the shelf life and reduce wastage (USDA, 2022). They are commonly consumed worldwide and serve as option for people with limited time due to their work

schedules. With more people leading busy lifestyles, there is a growing demand for products that can be easily and quickly prepared, such as frozen meals. Frozen foods are important food items in the diet of many Nigerians. The common frozen foods in Nigeria are frozen chicken, frozen turkey, frozen fish, frozen meat, frozen fruits and vegetables among others (Akerele *et al.*, 2020). Fish and poultry products including chicken and turkey are excellent sources of animal protein and contribute significantly to the dietary protein intake of billions of people across the globe. According to FAO (2020), almost 20% of total average intake of animal protein globally is attributable to fish. Fish is a good source of sulphur and essential amino acids such as lysine, leucine, valine and arginine and it is therefore suitable for supplementing diets of high carbohydrates contents. Chicken and turkey are white meat animal with high protein content and good sources of essential amino acids, vitamins and minerals. They are widely accepted meat in Nigeria without any religious taboo. Chicken and turkey are rich in vitamin B12, folic acid, selenium, potassium, magnesium, iron, phosphorus which help in reducing blood cholesterol and beneficial for both young and old (Belyakova *et al*., 2018; ACIAR, 2009).

Marketing is an essential part of agricultural activities as it is disastrous to produce commodities without an effective marketing outlet (Bakari and Ambali 2013). According to Olukosi *et al.* (2012), agricultural marketing is defined as the performance of all business activities which direct the forward flow of goods and services to consumers in order to accomplish the producer's objectives. The importance of agricultural marketing is not just for increasing consumption and productivity but also for accelerating economic growth. Specifically, marketing of frozen food plays an important role in the development of Nigerian economy, particularly in terms of employment generation for the populace (Oyedele, 2020).

Over the years, researchers have conducted various studies relating to frozen foods in Nigeria. Falola *et al.* (2021) in their study on demand for local frozen chicken in Ilorin metropolis, Kwara State found out that household size, monthly income, total monthly expenditure on frozen meats and price of local frozen chicken were significant factors influencing consumers' demand for local frozen chicken. Akerele *et al.* (2020) conducted a study on profitability analysis of frozen foods marketing in Ikorodu Local Government Area of Lagos State and found out that frozen foods marketing is profitable despite the challenges marketers are facing. A study titled profitability analysis of marketing of frozen fish in Kaduna metropolis was carried out by Usman *et al.* (2020) using marketing margin, marketing efficiency and rate of return on capital invested, their study revealed that frozen fish is price efficient and profitable with the rate of returns of about 0.11 and 0.22 for retailers and wholesalers respectively. Likewise, Ebewore (2013) conducted a study on assessment of marketing of frozen fish in Edo State, Nigeria, the results of the study revealed that frozen fish marketing is profitable enterprise with high rate of return. Coster and Otufale (2010) reported that the purchase price of fish, transportation cost, tax and stall rents were statistically significant factors related to selling price of fish. However, none of these studies focused on comparative study of the three frozen foods enterprises (fish, chicken and turkey) selected for this study. Therefore, the general objective of this study was to analyze the performance of frozen food marketing in Ilorin, Kwara State. The specific objectives were to: describe the market structure of frozen foods in Ilorin metropolis, estimate the profitability of frozen food marketing in the study area, determine the factors influencing the level of profit of frozen foods marketing, and examine the determinant of the choice of frozen foods enterprise in the study area.

MATERIALS AND METHODS

Study Area

The study was carried out in Ilorin metropolis of Kwara State, Nigeria. Kwara State is located within the North-Central geopolitical zone of Nigeria. The state is between the latitudes 8° 30′N and longitude 4° 45'E (NBS, 2016). Kwara state consists of 16 Local Government Areas and has a total land area of about 36,825 square kilometers with a total projected population of 4,719,844 people in 2021, and the large majority of individuals work in small-scale farming (NPC, 2022). The state is bounded in the north by Niger State, in the south by Osun and Ondo States, in the east by Kogi State, and in the west by Oyo State. The two main seasons in Kwara state are wet season which span between early April to late October and dry season between November to late March. The annual rainfall ranges from 1000 to 1500 millimeters and the average temperature ranges between 30 and 35 °C (Kwara State Ministry of Environment and Forestry, 2020).

Sampling Procedure

The sampling frame for this study comprised of the list of frozen food marketers in the major markets of Ilorin west and Ilorin south Local Governments Areas of Ilorin metropolis. Multi-stage sampling technique was used to select respondents for this study. Ilorin metropolis comprises three Local Governments Areas (LGAs) namely Ilorin east, Ilorin south and Ilorin west LGAs. The first stage of sampling involved purposive selection of Ilorin west and Ilorin south LGAs based on the prevalence of frozen food marketers in the two LGAs. In the second stage, three wards were selected from each LGA to make a total of six wards. In stage three, 30 frozen foods marketers were randomly selected from the major markets of the six selected wards to make a total of 180 respondents as the sample size for this study.

Data Collection

The data for this study were collected through interview schedule with the aid of a structured questionnaire. Variables measured include socio-economic characteristics, conduct, structure, efficiency and profitability of frozen foods marketing. Information on constraints affecting frozen foods marketing in the study area were also collected.

Data Analysis

Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to analyse socio-economic characteristics of frozen foods marketers and constraints associated with the marketing. Herfindahl Index (HI), marketing efficiency and marketing margin analysis were used to describe market structure and estimate frozen foods marketing performance respectively. Multiple linear regression and multinomial regression were used to analyze the factors determining the profitability of frozen foods marketing and the choice of frozen food enterprise among the respondents respectively.

The Herfindahl Index Model

The Herfindahl index (HI), $HI = \Sigma S_i^{2 \cdots}$ …… (1)
$Si = Qi/Q$ …… ……... (2)
Where:
Si = Market share for ith respondent,
Qi = Total number of kg of frozen food sold per cycle by respondent i, and
Q = Total number of kg of frozen foods sold per cycle by all respondents.

Here, it is important to note that the value of HI ranges from 0 to 1. A market with an HI of less than 0.15 is considered a competitive marketplace, an HI of 0.15 to 0.25 is moderately concentrated, and an HI greater than 0. 25 is considered to be highly concentrated market.

Marketing Efficiency Model

Market Efficiency:

$$ME = \frac{\text{Total Revenue}}{\text{Cost of marketing services}} X100 \quad \text{……..……...……..(3)}$$

Marketing Margin Model

$$MM = \frac{CP-SP}{CP} X100 \quad \text{…… (4)}$$

Where:
MM = Marketing Margin
CP =Consumer Price (₦/50kg carton)
SP = Supply Price (₦/50kg carton)

Multiple Linear Regression Model Specification:

$Y=\beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\beta_5X_5+\beta_6X_6+\beta_7X+\beta_8X_8+ei$ ……..…… (5)

Where:
Y=Profit margin (₦/50kg carton)
X_1= Age of marketers (years)
X_2=Cost of marketing service (₦/50kg carton)
X_3=Marketing experience (years)
X_4=Education (years of schooling)
X_5= Gender of marketers (male=1, female=0)
X_6= Selling price of the products (₦/50kg carton)
ei = Error term
β_0 = intercept (or constant)
$\beta_1, \beta_2 \ldots \beta_8$ = ith coefficient corresponding to $X_1, X_2 \ldots X_8$

Multinomial Regression Model

The Multinomial regression model was used to examine the determinant of choice of frozen food enterprise among marketers. Though there are various enterprise combinations among the respondents, we made our categorization into fish, chicken and turkey enterprise based on the major commodity traded by each respondent and this formed the three levels of the regresand for the multinomial model. Explicitly, the multinomial model is expressed as:

$$Y_{ij} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + e_{ij} \quad \text{.....} \quad (6)$$

Where:
Y_{ij} = denote the 3 frozen food enterprises (fish = 1, chicken = 2, and turkey = 3).
βj = coefficient of X_{ij}
Xij = factors that determine the choice of a particular frozen food enterprise, explicitly stated as:
X_1= Age (number of years)
X_2= Cost of marketing services (₦/50kg carton)
X_3= Marketing experience (years)
X_4= Education (years of schooling)
X_5=Gender of marketers (male=1, female=0)
X_6= Cost of the frozen product (₦/50kg carton)
eij = error term

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents

Table 1 presents the result of the socio-economic characteristics of respondents. There were more female frozen food marketers than male marketers in the study area as majority of the respondents (67.8%) were females. This could probably be because women tend to be more entrepreneurial and risk-taking when it comes to starting ventures like frozen food business which requires less energy compared with men who engage in artisan and other energy-intensive businesses. This result agrees with the finding of Usman *et al.* (2020) who reported that majority of the frozen fish marketers were females in Kaduna State. About 72.2% of the respondents were married while 11.1% and 12.2% were single and widowed respectively. Almost half (47.2%) of the respondents were between the ages of 31-40 years while only 8.9% were above 50 years of age. The average age of the frozen food marketers was 38 years which indicates that most of the marketers were still within their active age, and this corroborates the finding of Olaniyi *et al.* (2022) on their study on socio-economic and profitability analysis of retailing frozen fish in Rivers State. In relation to education, majority (45.6%) of the respondents had secondary education while only 7.8% had primary education which implies that most of the respondents were literate. This concurs with the work of Usman *et al.* (2020) where they reported that frozen fish marketers were mostly educated. Larger proportion (72.8%) of the respondents had 1-10 years frozen foods marketing experience, while only 2.1% had between 31 and 40 years of experience. About 36.7% of the respondents got their credits from cooperatives and only 1.1% of them got their

credits from banks. The low percentage recorded for credits source from bank could be attributed to high interest rate that is mostly operated in Nigerian commercial banks.

Table1: Socioeconomic characteristics of the respondents

Variable	Classes	Frequency	Percentage	Mean / Std. dev
Gender	Male	58	32.2	
	Female	122	67.8	
Marital status	Single	20	11.1	
	Married	130	72.2	
	Widowed	22	12.2	
	Divorced	08	4.4	
Age (years)	21-30	41	22.8	
	31-40	85	47.2	38 ± 8.34
	41-50	38	21.1	
	≥51	16	8.9	
Level of education (years)	1-6	14	7.8	
	7-12	40	22.2	12 ± 4.14
	13-18	82	45.6	
	Above 18	44	24.4	
Household size (persons)	1-5	164	91.1	
	6-10	16	8.9	4 ± 1.22
Marketing experience (years)	1-10	131	72.8	
	11-20	40	22.2	9 ± 6.87
	21-30	05	2.8	
	31-40	04	2.2	
Sources of credits	Friends & relatives	46	25.6	
	Cooperatives	66	36.7	
	Thrift society	48	26.7	
	Personal savings	18	10.0	
	Banks	02	1.1	

Table 2: Herfindahl Index share of frozen food markets

Variables	Fish	Chicken	Turkey
Total quantity of frozen food sold by all marketers (kg)	508,500	454,140	318,780
Herfindahl index (Sum of square of market shares)	0.04	0.05	0.08

Structure of Frozen Foods Market

Table 2 depicts structure of frozen food markets using Herfindahl Index. The result shows Herfindahl index values of 0.04, 0.05 and 0.08 for fish, chicken and turkey respectively. The values indicate a highly competitive and non-concentrated frozen food market structure as the obtained HI figures for the three enterprises were below 0.15. This may be attributed to the presence of many suppliers of frozen products in the market as well as the large consumer base with diverse tastes and preferences for various frozen food products. Comparatively, frozen fish enterprise was more competitive than the other two

enterprises as its Herfindahl index values was the lowest among the three enterprises. Higher level of competitiveness recorded for fish may be credited to the fact that fish commodity commands more patronage than chicken and turkey counterpart as the former is more affordable by the populace than the other two products. Consequently, many sellers are into frozen fish in order to meet up with demand from many buyers. This is in parity with the findings of studies on structure of various agricultural produce earlier conducted by researchers (Bakari and Ambali, 2013; Nofiu *et al.*, 2021).

Profitability and Efficiency of Frozen Food Marketing

Table 3 shows the profit margin, marketing margin and efficiency per 50kg pack of each of the frozen foods considered for this study. Profit margin of ₦14,959.9, ₦21,882.9 and ₦21,710.9 were recorded for fish, chicken and turkey respectively. Comparatively, among the three enterprises, chicken enterprise shows the highest profit margin per 50kg carton. This may be attributed to the increasing trend of domestic poultry production as well as the growing demand for poultry meat among the teaming population in Nigeria. However, in terms of return on investment (ROI), fish recorded the highest value of 1.24, followed by chicken and turkey with ROI values of 1.22 and 1.18 respectively. This implies that for every ₦1 invested in frozen fish, chicken and turkey enterprise, there were return of 24k, 22k and 18 k respectively. Furthermore, there were marketing margins of 35.42, 28.96 and 24.59% for fish, chicken, and turkey respectively and this shows that fish enterprise exhibits the highest percentage of price spread between suppliers and consumers. The reason for higher profit margin for frozen fish may be ascribed to the fact that there is less competition from frozen chicken and turkey in relative frozen fish products, thereby allowing frozen food sellers to charge premium prices for frozen fish without facing too much competition from other two products The efficiency of frozen foods marketing was 124.34%, 122.91% and 118.74% for fish, chicken, and turkey respectively. The marketing efficiency for each of the three enterprises is greater than 100 percent and this implies that all the enterprises were efficient. The findings agree with Olaniyi *et al.* (2022) who reported a positive net return and high profitability index for every capital invested.

Table 3. Marketing margin and efficiency of frozen foods (₦/50kg)

Variables	Fish	Chicken	Turkey
Cost of frozen product	49,347	83,394	103,726
Transportation	592.76	693.00	748.20
Rent of shop	4,685	4,685	4,685.00
Depreciation on cold-room	3,078.33	3,078.33	3,078.33
Spoilage	1,987.35	1,887.11	1,831.86
Depreciation on refrigerator	1,769.66	1,769.66	1,769.66
Total cost	61,460.1	95,507	115,839.1
Total revenue	76,420	117,390	137,550
Profit Margin	14,959.9	21,882.9	21,710.9
Return on Investment	1.24	1.23	1.19
Marketing margin (%)	35.42	28.96	24.59
Efficiency	124.34	122.91	118.74
Return on investment	1.24	1.22	1.18

Factors Influencing Profitability of Frozen Foods Marketing

Table 4 presents the result of regression analysis of the factors influencing profitability of frozen foods marketing among the marketers. The result of the frozen fish enterprise reveals that age, marketing experience and selling price of fish were all positive and significant at 1% level of significance. This shows that increase in any of these positive variables such as age, marketing experience and selling price of fish translates to higher profit. Cost of marketing services such as transportation cost, rent of shop, depreciation on cold room and refrigerator was negative and significant at 10% level, implying that an increase in this variable brings about decrease in profit level. This implies that older and experience marketers often possess more skills and knowledge than younger ones, which can help them make better decisions that lead to higher profits. The result is in accordance with the findings of Esiobu and Onubuogu (2014) who reported that age and marketing experience significantly influenced the profit margin of frozen fish marketing in Imo state.

For frozen chicken market, level of education was positive and statistically significant at 1% in influencing the profitability of the enterprise, connoting that the higher the level of education of frozen chicken marketers, the more profit is accrued to their business. Gender of the marketers and cost of marketing services were negative and statistically significant at 1% and 5% respectively. This indicates that an increase in the cost of marketing service reduces the profit per carton of frozen chicken by ₦0.25 and male marketers made lesser profit in frozen chicken business than the female marketers. With regards to profitability of frozen turkey enterprise, selling price had positive and significant influence on profitability at 1% level of significance while other factors such as cost of marketing service and gender had negative and significant influence at 1% and 5% level respectively. The results corroborate the findings by Oladejo (2011) that factors such as price, cost of marketing service and years of schooling significantly determined the profit margin of frozen poultry product in Badagry area of Lagos State. The coefficient of determination R^2 of 0.70, 0.60 and 0.60 were recorded for regression model of fish, chicken and turkey respectively, indicating that the explanatory variables included in the models were able to explain 70 %, 60% and 60% of the variability in the level of profitability of fish, chicken and turkey enterprise respectively.

Table 4: Multiple linear regression analysis for factors influencing profitability of frozen foods

Variables	Fish		Chicken		Turkey	
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Constants	15.434	7.68***	26.0716	6.88***	38.766	2.35**
Age	19.85	3.72***	14.03	0.33	36.66	0.74
ME	12.43	3.67***	38.25	1.05	91.39	0.26
CMS	−0.6630	-1.76*	-0.2540	-2.06**	-0.8432	-4.39***
Education	437.469	1.04	150.64	5.48***	135.134	1.01
Gender	120.660	1.12	−285.61	-3.60***	−639.95	-2.22**
SPP	0.1166	7.78***	0.6452	1.78*	0.1946	3.53***
R^2	0.6844		0.5788		0.5846	

ME = Marketing experience, CMS = Cost of marketing services, SPP = Selling price of products

Determinants of the Choice of Frozen Foods Enterprise among Marketers

Table 5 presents the result of the multinomial regression analysis of the factors determining the choice of frozen foods enterprise among the respondents. Fish enterprise was considered as a reference category to other kinds of frozen foods enterprise. For the choice of chicken enterprise, age of the respondents and cost of frozen foods had a negative and significant influence on the likelihood of choosing chicken enterprise over the fish enterprise all at 10% level of significance, indicating that young frozen food marketers prefer chicken enterprise to fish enterprise. More so, increase in the cost products decreases the likelihood of engaging in frozen chicken enterprise relative to frozen fish enterprise. On the other hand, marketing experience, and educational level of the marketers had positive and significant effect on the likelihood of choosing chicken enterprise over the fish enterprise both at 1% level of significance. This indicates that an increase in marketing experience, and educational level of the marketers increases the probability of choosing chicken enterprise over the fish enterprise. Similarly in relation to turkey enterprise, age of the respondents and cost of frozen products also had negative and significant influence on likelihood of choosing turkey enterprise relative to the fish enterprise at 10% and 1% level of significance respectively. By implication, young marketers prefer turkey enterprise to fish enterprise but the more the price of turkey product increases the lesser the chance of investing in frozen turkey product relative to fish product. Marketing experience had positive and significant influence on the likelihood of choosing turkey enterprise over the fish enterprise at 1% level of significance. This indicates that an increase in marketing experience increases the probability of choosing turkey enterprise over the fish enterprise.

Table 5: Multinomial logistic regression of the determinants of choice of frozen food markets

Frozen foods enterprises	Coefficient	Standard Error	t-statistic
Chicken			
Intercept	2.39	0.72	3.32***
X_1 (Age)	-0.75	0.42	-1.79*
X_2 (Cost of marketing service)	-1.73	1.35	-1.28
X_3 (Cost of frozen products)	-1.18	0.63	-1.87*
X_4 (Marketing experience)	4.35	0.52	8.37***
X_5 (Gender)	-5.46	6.91	-0.79
X_6 (Education)	7.44	0.81	9. 18***
Turkey			
Intercept	1.79	0.82	2.18**
X_1 (Age)	-0.81	0.46	-1.76*
X_2 (Cost of marketing service)	-1.24	3.33	-0.37
X_3 (Cost of frozen products)	-3.26	0.52	-6.27***
X_4 (Marketing experience)	1.47	0.53	2.77***
X_5 (Gender)	-5.42	7.73	-0.70
X_6 (Education)	6.42	5.51	1.17
LR chi2(28)	304.41		
Prob > chi^2	0.01		
Pseudo R^2	0.65		
Log likelihood	-54.15		

The reference category is fish enterprise

CONCLUSION

Based on the outcome of the research findings, it can be concluded that frozen foods marketing is highly competitive and non-concentrated. Marketing of all the frozen foods enterprises considered in this study is competitive, efficient, and profitable. The level of profitability of the selected frozen foods was influenced by age, gender, cost of marketing services and selling price of frozen products. In terms of enterprise selection, young frozen food marketers preferred investment in frozen chicken and turkey than the frozen fish enterprise, governments' empowerment programs should be directed towards youth empowerment in frozen food business so as to improve their level of market participation and employability in the study area.

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