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Profitability of Beef Value Chain Marketing in Delta State, Nigeria

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Abstract: The study determined the profitability of beef value chain marketing in Delta State. A two-stage sampling technique was used for the study. The first stage was a purposive selection of four major towns: Asaba in Oshimili North, Warri in Warri South, Agbor in Ika South and Ughelli in Ughelli North Local Government Area of Delta State. These towns were sellected for the study because of the high marketing activity of beef in these places. The second stage involved a random selection of 320 beef marketers in the open market, abattoirs, meat shops and hotels across the four Local Government Areas. The distribution of the sample was based on proportion to size using Taro Yamane formula. The result of the study showed that beef marketing comprise of marketers who are married and advanced in age, their mean age were 46.6 years for the abattoirs; 47.5 years for the open market; 46.7 years for the meat shops and 51.9 years for the hotels. The average years of experience for the abattoirs, open markets, meat shops and hotels were 10.5; 12.7; 13.9 and 13.8 years respectively. The result of the study also showed that the distance that the marketers convey their beef to the market ranges from 6km to 15km. Majority of the marketers cover a long distance to convey their beef to the market. The implication of this is that the marketers will have to pay higher cost of transportation in conveying their beef to the market and this will have effect on their sales gross margin. The findings showed that the highest cost was the cost of beef and transportation: the cost of beef and transportation in each of the four different beef market value chains; abattoirs, open markets, meat shops and hotels were ₦255,000, ₦247,000, ₦253,200, ₦264,150; and ₦5479.2, ₦4305.8, ₦4123.4, and ₦4220.6respectively. The average total revenue for each of abattoir, open market, meat shop and hotel were ₦379,650, ₦384,450, ₦436,650 and ₦459,210 respectively. From the gross marigin analysis the largest share of gross margins was earned by abattoir operators who generated an average gross margin of ₦176 041.5 (39.7%) followed by the hotels, ₦150, 149.1 (35.3%), then the meat shops ₦127, 620.6 (32.5%) and finally the open markets ₦111,365.9 (30.1%). Therefore, beef value chain marketing in Delta State is a profitable enterprise. The efficiency of beef marketing under the four different marketing value chains was found to be highest for the hotels (1.56), followed by meat shops (1.35), abattoirs (1.24) and then open markets (1.20). Based on the findings of the study if efforts are made by the marketers in marketing quality beef the marketers will gain higher and more reliable returns and resources just as the customers will gain more satisfaction on the value of money spent on the purchase of beef.

Keywords: Beef Marketing Chain, Value Cost, Abattoir, Open Market, Revenue, Meat Shop, Hotel

1. Introduction

1.1. Background of Study

Nigeria is the largest livestock market in Sub-Saharan Africa (SSA) with a population of more than 170 million people. Its agriculture account for 33 percent of GDP and provides employment for more than 60% of the population. Its growth rate is estimated at three percent annually, however, crop production dominates the agricultural sector and accounts for about 85 percent of agricultural activities, while livestock and poultry account for 10 percent, and fisheries and forestry less than one percent [14]

Cattle are the single most important livestock species in terms of outputs and capital value. While sheep and goats are raised throughout the country cattle are largely concentrated in the dry savannah parts of the country predominantly managed by pastoralists who hold about 95 percent of cattle in Nigeria and are managed under the smallholder production systems [4]. Although it cannot be ruled out that Nigeria's cattle are a key part of its food security, the events that have occurred over the last five years have affected the cattle industry and the beef market value chain in Nigeria. According to the research [3] the activities of the Boko Haram in the North East and the clash between the Fulani herdsmen and farmers in the middle belt also attributed to the decline in the production of cattle which has forced nomadic Fulani herdsmen to abandon their foraging grounds.

Considering the high importance of beef in the diet of man as a source of protein and its wide acceptance, its marketing should be examined. According to the authors [5, 6] beef marketing provides the largest livestock market in Nigeria. The industry provides employment for a large number of the population, including butchers, abattoir owners, meat shop owners, transporters and other marketers. This does not include the millions of Nigerians who make their livelihood from beef enterprises as cattle grazers/nomads, beef producers/processors; veterinary services providers, and providers of several ancillary services. Government agencies also realize a lot of revenue from the beef industry through various forms of levies, market charges and direct taxation. A lot of families depend on the business of beef marketing for sustenance. Those involved in the beef marketing also depend on it as a source of livelihood [6].

In the last five years, different administrations have focused on agriculture as a means to diversify the economy with several policies of Agricultural Transformation. Despite these policy interventions, the agricultural sector is still largely underdeveloped, primarily because the focus is more on production with less emphasis on marketing. This has led to imperfection and inefficiency in the marketing system and the resultant effects on prices and demand. These are the most pronounced problems in the marketing of beef across the country. Adding value in the marketing of beef across the value chain segment can enhance the efficiency of the beef market industry. In terms of value addition beef could be marketed in the form of cooked beef, babicule", suya", dried beef and corn beef.

Beef supply in Nigeria accounts for about 70% of the total national meat supply in the country yet not enough to meet with the increasing demand for meat because the domestic production and documented importation of cattle is still lower than the actual demand of meat in Nigeria [20]. There is every reason to worry about this situation in Nigeria because the fact that beef is mostly consumed in Nigeria may create a situation in which there could be increase in the transaction cost in the marketing chain which could lead to the upward trending of the final retail price of beef. The effect of this activity is capable of making beef inaccessible to the poor.

Beef is the third most consumed protein available in the world, accounting for 25 percent of meat production worldwide and about 1.3 million cattle are slaughtered annually to provide meat for the Nigeria's population of about 190 million people [24]. The per capita meat consumption in Nigeria is one of the lowest in the world which stands at 1.8 kg per person per year while that of the sub-Saharan Africa region is about 3.3 kg [8]. With the increasing population in Nigeria the demand for meat will not be able to meet up with the available meat for consumers except something is done urgently to improve the beef marketing system.

The supply of cattle and its product have been declining while the demand has been increasing. The short fall in supply of cattle has often been linked to the highcost of marketing, because the cattle are brought from the Northern part of the country to the South, usually there is high cost of transporting the cattle considering the long distance that the traders have to travel with them [11]. Omotosho, J. K. [21] explained that beef marketing system is imperfect based on the fact that is no standardize measurement of meat by the marketers as majority of them do not actually make use of scale to weigh their products, which would have enhanced the marketing. He observed that there is the basic problem of the unequal bargaining power of various links in the marketing chain. Bernard, C. et al. [4] also stated that another problem of the beef marketing system is the problem of price and sales volume fluctuation over the years as a result of high perishable and decomposing nature of beef when exposed to contaminants. The beef subsector requires highly coordinated efforts from the key actors in order to improve the beef value chain marketing system in Nigeria.

1.2. Objectives of the Study

The overall aim of this study is to determine the profitability of beef value chain marketing in Delta State. The specific objectives are to;

1. Describe the socio-economic characteristics of beef marketers at four different marketing channels in Delta State.
2. Assess the cost and revenue of beef marketing from four different marketing channels in Delta State.
3. Evaluate the marketing efficiency of beef marketing at four different marketing channels in Delta State.

2. Materials and Method

2.1. Area of Study

The study was carried out in Delta State. Delta State was once an integral part of the old Western Region of Nigeria. It became an autonomous entity on August 27, 1991 after having been part of the old Midwestern State in 1963- 1976 and the defunct Bendel State 1976-1991. Delta State started with twelve Local Government Areas (LGAs) which were split into nineteen local governments on September 27, 1991, and to twenty-five LGAs in 1997. Asaba, located at the northern end of the state, is the capital of Delta State, with an estimated area of 762 sq. km. [7]

Delta State which is known as the "Big Heart" of Nigeria is also called the finger of God. It lies between longitudes $6^{0}13^{1}$ and $6^{0}25$ East, and latitudes $6^{0}06^{1}$ and $6^{0}22^{1}$ North. One third of the state lies in mangrove swamp. The State is located in the western part of the Niger Delta by the Gulf of Guinea in the Atlantic Ocean. The coast line is 167km^2. It has a total land area of 16,842 sq. km. The states bordering Delta State are Edo to the North, Ondo to the northwest, Anambra to the East and Bayelsa and Rivers to the southeast. Delta State currently has twenty five Local Government Areas. They are: Aniocha North, Aniocha South, Bomadi, Burutu, Ethiope East, Ethiope West, lka North East, lka South, Isoko North, Isoko South, Ndokwa East, Ndokwa West Okpe, Oshimili North Oshimili South, Patani, Sapele, Udu, Ughelli North, Ughelli South, Ukwani, Uvwie, Warri North, Warri South and Warri South West.

According to the 2006 National population census the population of Delta State is made up of 4,098,391 people in which 2,074,308 are males and 2,024,085 are females spread in the 25 Local Government Areas. Generally, the average density of population in the state is 149 persons per sq. km. The most densely populated local government areas are Uvwie (1,311 per sq. km), Udu (541 per sq. km), Bomadi (541 per sq. km), Warri South (415 per sq. km), Sapele (363 per sq. km), and lka South (300 per sq. km). Areas with fairly high population density are Ethiopia East (293 per sq. km), Isoko North (282 per sq. km), Oshimili south (275 per sq. km). The riverine areas of Warri North (17 per sq. km), Warri South West (27 per sq. km.), Ndokwa east (42 per sq, km) and Burutu (88 per sq. km), all in the swampy regions have very low population densities.

Delta State is situated in the tropics and therefore experiences a fluctuating climate, ranging from the humid tropical in the south, to the sub-humid in the northeast. The lessening of humidity towards the north is accompanied by an increasingly marked dry season. The average rainfall is about 266.5mm in the coastal areas and 1905mm in the extreme north. Rainfall is heaviest in July. Temperature increases from the south to the north. In Warri, located in the south for example, the average daily temperature is 30°C, while the temperature in Asaba in the north eastern area is 44°C.

2.2. Method of Data Collection

Primary data were collected from key actors involved in beef marketing: butchers, open market, meat shop and hotel operators. Secondary data were collected from journals, newspapers, text books and internets.

2.2.1. Population

The population of study includes all the beef marketers at the open markets, abattoirs, meat shops and hotels in four lLocal Government Area of Delta State. There are 1595 beef marketers in the study area.

2.2.2. Sampling

A two-stage sampling technique was used for the study. The first stage was a purposive selection of Asaba in Oshimili North, Warri in Warri South, Agbor in Ika South and Ughelli in Ughelli North Local Government Area of Delta State. These LGAs and towns were sellected for the study because of the high marketing activity of beef in these areas. The second stage involved a random selection of 320 beef marketers in the open market, abattoirs meat shops and hotels across the four Local Government Areas. The distribution of the sample was based on proportion to size using Taro Yamane formula.

The sample frame for the study was made up of beef marketing value chain actors: butchers, beef sellers in both the open and close markets (meat shops) as well as hotel operators. The Sample size was determined by using Taro Yamane formula as shown below: [16]

$$n = \frac{N}{1+(e)^2}$$

Where: n = Sample size

N = Population size

e = Limit of tolerance error

With a significance level of 95% the degree of tolerance level will be 5% (i. e. 0.05).

Mathematically the sample size was calculated as follows:

Sample size $= \frac{1595}{1+1595(0.05)^2}$=320 approximately

2.3. Data Analysis

Data were presented in frequency distribution tables, percentages and mean. The efficiency of beef value chain marketing was analyzed using Acharya's Modified Marketing Efficiency (MME) model.

3. Results and Discussion

Socio-economic characteristics of respondents.

3.1. Age of Respondents

The findings from the analysis showed that a larger number of the respondents that were in the age bracket of 45-54 years were butcher (in the abattoirs) (52.6%), sellers in the open markets were 48.3% while the the meat shops and hotels were represented with 44.4% and 25% respectively. The number of respondents within the age of 35-44 years for abattoirs, open markets, meat shops and the hotels were 22.7%, 40%, 33.3% and 20.8% respectively. Between the ages of 25-34 years as represented for the abattoirs, open markets, meat shops and the hotels were 1.7% respectively. Those respondents that their ages were less than 25 years were found only in the abattoirs (7.5%), open markets (5%). Whereas respondents whose age were above 65 years were found only in abattoirs (5%), meat shop (5.56%) and hotels (12.5%), (Table 1).

The mean age of the respondents for the abattoirs, open markets, meat shops and hotels were 46.6, 47.5, 46.7 and 51.9 years respectively. This finding showed that beef marketing is dominated by people who are advanced in age. This agrees with the findings [17] which reported that the average age of cattle product marketers is about sixty years. Age can affect the experience, wealth and decision making which in turn will affects how one works andhence, can influence enterprise productivity [18, 19]. Age influences the income generating capacity of an individual. Kadigi, M. L. [10] urges that in total the accumulation of wealth is highly dependent on age of an individual, whereby a direct relationship is experienced; likewise, age determines individual maturity and ability to make rational decisions.

3.2. Gender of Respondents

The result shows that 100% of respondents were males for the abattoirs. About 76.9% were females and 23.1% of respondents were males for the open markets, while 58.3% were females and 41.7% were males for the meat shops. Also, about 25% were females and 75% were males for the hotels. The reason why the respondents for the abattoirs were only males could be due to the fact that handling cattle involves physical activities such as restraining, falling and slaughtering; hence males are more capable due to their masculine nature. However, for the open market the females show their dominance over the males, while for the meat shop there was a close range between the males and females. But for the hotels, the males dominate the females. This finding is similar to the result reported [13] that there were more women involved in beef marketing. The gender of the beef marketers has socio-economic implications in an economy. It has an implication on the roles and responsibilities in the society, and therefore can influence marketers' abilities to generate income.

3.3. Marital Status of Respondents

The findings showed that a large number of the respondents for the abattoirs, open markets, meat shops and hotels were married representing 74.2%, 78.9%, 75% and 70.8% respectively, 9% were single for the abattoirs, 4.08% for the open markets, 5.56% for the meat shops and 8.33% for the hotels. 6.19% for the abattoirs were divorced, 7.48% for the open markets, and 8.33% each for both the meat shops and hotels, while the respondents for the abattoirs, open markets, meat shops and hotels who were widows/widowers were 11.3%, 9.54%, 11.1% and 12.5% respectively.

Marriage under this circumstance was considered as any union between a man and a woman regardless whether it was traditional, court, Islamic or church marriage. According to the marketers their marriage status usually induces them to work hard in order to fulfill their family responsibilities.

3.4. Education of Respondents

The findings showed that respondents who were with primary education were 37.1% in the abattoir 37.4% in open shops, 11.1% in meat shops and 8.33% in hotels. However, only 3.75% of respondents in both abattoirs and the open markets were reported to have attained a college education while about 54.6% and 58.9% of the respondents in the meat shops and hotels respectively attained the colleges / poytechnic and the university education.

Education plays a paramount role in all aspect concerning the day to day activities. Formal education helps someone to decide rationally and hence enabling him/her to manage his/her business and operates in the required specifications while the aspect of no formal education reduces the ability of the marketers to argue and defend their right of selling their beef in the markets. According to Mather and Adelzadeh (2008) people with higher educational levels are more able to interprete information than those who have less education or no education at all.

Musemwa, L. et al. [12] stated that, education has a significant influence on the social and capital status of an individual in terms of health, wealth, lifestyle and the quality of life of the individual in a particular society. In addition, a study done [9] they found out that a positive relationship exists between years of formal education and higher bargaining power for educated beef marketers since beef marketers are more likely to use the existing market information more efficiently to negotiate for higher price and have more sales rate.

3.5. Experience of Respondents

Findings from the analysis show that the respondents who had experience above 20 years were reported to be 46.4% for abattoirs, 46.9% for open markets, 63.9% for meat shops and 62.5% for hotels. The respondents who had experience between 16- 20 years were 27.8% for abattoirs, 29.9% for open markets, 27.8% for meat shops and 29.2% for hotels while those respondents with 11-15 years of experience for Abattoirs, open markets, meat shops and hotels were 17.5%, 19%, 8.33%, and 8.33% respectively.

However, respondents with less than 11 years of experience in marketing at abattoirs and open markets were 8.24% and 4.08% respectively. In both theoretical and practical situations, experience of marketers is an important human capital that can influence the production efficiency, profitability, business performance and market conduct of an individual and the society at large [22]. The proper use of resources in marketing will highly depend on the experience and knowledge of the marketer. This assertion is in line with Musemwa, L. et al. [12] who stated that, experience has a vital role in the marketers' choice for better market channels and levels for receiving good prices. Therefore, it is expected that additional years of experience in beef marketing would enable the marketers to improve the quality and increase the profit of beef sold.

3.6. Distance to Markets

The result of the study shows that the distance that the marketers cover to convey their beef to the market ranges from below 6km to above 15km. The study shows that respondents at the abattoir, open markets, meat shops and hotels who travel 6-10km and 11-15km were 42.3.%, 43.5%, 22.2% and 12.5%; and 34%, 32%, 36.1% and 45.8% respectively. On the other hand respondents who convey their beef to the market at a distance of less than 6km and more than 15km were 12.4%, 12.8%, 13.9%and 8.33%; and 11.3%, 16.3%, 27.6% and 33.3% respectively. From this findings, it shows that majority of the marketers cover a long distance to convey their beef to the market. This implies that the marketers will have to pay higher cost of transportation in conveying their beef to the market and this will have effect on their sales gross margin.

***Table 1.** Distribution of respondents according to their socio-economic.*

Gender	Abattoir		Open market		Meat shop		Hotel	
	Frequency	**%**	**Frequency**	**%**	**Frequency**	**%**	**Frequency**	**%**
Male	78	80.4	34	23.1	15	41.7	18	75
Female	19	19.6	113	76.9	21	58.3	6	25
Age								
<25	2	5	0	0	2	8.33	2	8.33
25-35	11	11.3	9	22.5	2	5.56	2	8.3
36-45	22	22.7	46	40	12	33.3	5	20.8
46-55	51	52.6	71	48.3	16	44.4	6	25
56-65	8	8.25	20	7.5	8	22.2	10	41.7
>65	2	2.06	0	0	0	0	3	12.5
Marital	Status							
Single	9	9.27	6	4.08	2	5.56	2	8.33
Married	72	74.2	116	78.9	27	75	17	70.8
Divorced	6	6.19	11	7.48	3	8.33	2	8.33
Widow/ Widower	11	11.3	14	9.54	4	11.1	3	12.5
Education								
No formal Education	11	11.3	14	9.52	3	8.33	2	8.33
Primary	36	37.1	55	37.4	4	11.1	2	8.33
Secondary	42	43.3	74	50.3	9	25	6	25
College/ Polytechnic	6	6.19	4	2.72	15	41.7	9	37.5
University	2	2.06	0	0	5	13.9	5	20.8
Experience (years)								
<6	8	8.24	6	4.08	0	0	0	0
6-15	45	46.4	28	19	3	8.33	2	8.33
16-25	27	27.8	44	29.9	10	27.8	7	29.2
>25	17	17.5	69	46.9	23	63.9	15	62.
Total	97	100	147	100	36	100	24	100

Source: Survey Data 2019

***Table 2.** Distribution of respondents according to distance to markets.*

Distance (km)	Abattoir		Open market		Meat shop		Hotel	
	Frequency	**%**	**Frequency**	**%**	**Frequency**	**%**	**Frequency**	**%**
<6	11	11.3	24	16.3	10	27.8	8	33.3
6-10	33	34	47	32	13	36.1	11	45.8
11-15	41	42.3	64	43.5	8	22.2	3	12.5
>15	12	12.4	12	8.16	5	13.9	2	8.33
Total	97	100	147	100	36	100	24	100

Source: Survey Data 2019

Cost and Revenue of beef marketing

The findings showed that the highest cost was the cost of beef and transportation: the cost of beef and transportation in each of the four different beef market value chains- abattoirs, open markets, meat shops and hotels were ₦255,000, ₦247,000, ₦253,200, ₦264,150; and ₦5479.2, ₦4305.8, ₦4123.4, and ₦4220.6respectively. The average total revenue for each of the value chains-abattoir, open market, meat shop and hotel were ₦379,650, ₦384,450, ₦436,650 and ₦459,210 respectively. From the gross margin analysis the largest share of gross margins was earned by abattoir operators who generated an average gross margin of ₦176 041.5 (39.7%) followed by the hotels, ₦150, 149.1 (35.3%), then the meat shops ₦127, 620.6 (32.5%) and finally the open markets ₦111, 365.9 (30.1%).

***Table 3.** Cost and Revenue of beef value chain marketing.*

Items	Abattoirs	Open market	Meat shop	Hotels
Average variable costs (N)				
Cost of beef	255,000	247,000	258,200	264,150
Transportation	5,479.20	4,305.80	4,123.40	4,220.60
Slaughtering fees	2,500	2,155.10	2,185.10	2,240.80
Labour	3,120.10	3,192.30	2,173.40	2,125.20
Others (packaging materials)	1,543.60	1,437.40	1,354.30	2,347.50

Items		Abattoirs	Open market	Meat shop	Hotels
Average total	variable costs	267,642.80	258,090.60	264,036.20	265,083.90
Average total costs (N)		287,612.40	278,065.50	283,126.30	285,165.40
Revenue (N)					
Average total revenue		443,684.30	369,456.50	391,656.80	425,233.20
Gross margin		176,041.50	111,365.90	127,620.60	150,149.10

Analysis of the efficiency of beef value chain marketing using Acharya's MME model

Marketing efficiency is often used in evaluating the performance of the marketing process. Efficiency is a measure of performance of a system; it may be marketing or production performance. Acharya's Modified Marketing Efficiency (MME) was used to analyse the marketing efficiency at the different beef market value chains. The authors [1, 2] measurement of marketing efficiency compared the efficiency of alternative marketing channels which considers the total marketing cost (MC), marketing margin (MM), price received by the farmer (FP) and prices paid by the consumers or retail price (RP). The marketing efficiency of beef under different marketing value chains is presented in Table 3. Using Acharya's method (i. e. price received by the producers divided by the total marketing cost and margin); It was found to be highest for the hotels (1.56); followed by meat shops (1.35), abattoirs (1.24) and then open markets (1.20). The findings show that market efficiency decreases as the marketing costs and/or margins of intermediaries in the value chain increases and vice-versa.

Table 4. *Analysis of the efficiency of beef market value chains using Acharya's MME model.*

Items	Abaittoirs	Open market	Meat shops	Hotels
Selling price/kg (N)	1,465.50	1,481.50	1,563.50	1,630.70
Marketing costs				
Market fees	50	70	30	35
Transportation	170.2	143.8	141.4	142.6
Electricity	100.5	115.1	118.1	124.8
Rent	120	122.1	273.4	312.5
Others				
(packaging, storage etc)	144.6	143.4	154.3	167.5
Marketing costs MC (N)	485.6	494.4	417.2	410.4
Purchase price	824.2	884.3	923.2	935.4
(producer's price) (FP)				
Market margin MM (N)	156	203.8	143.1	134.9
Efficiency (MME)	1.24	1.2	1.35	1.56

Computed from Survey Data 2019

4. Conclusion and Recommendation

The efficiency of beef marketing under the four different marketing value chains was found to be highest for the hotels (1.56), followed by meat shops (1.35), abattoirs (1.24) and then open markets (1.20). Therefore, if efforts are made in improving the efficiency of beef marketing the marketers will gain higher and more reliable returns and resources just as the customers will gain more satisfaction on the value of money spent on the purchase of beef.

Recommendations

Based on the findings of the study the following recommendations are made:

1. Market officials/Associations leaders should avail marketers with market information particularly about prices through radio, television, posters and local newspapers.
2. The location of markets should be in areas where there are more population of consumers so that marketers will be able to make more sales.
3. Marketers should make efforts to package quality beef in order to attract many buyers.

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