

SUSTAINABLE MARKETING OF BAMBOO (*BAMBUSA VULGARIS*) AND FIRMS PERFORMANCE IN OSUN STATE, NIGERIA

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Abstract

Marketing of bamboo in most developing countries including Nigeria is characterised by high level of inefficiencies. This study, therefore, assesses the factors that could influence the sustainable marketing of bamboo and examine the performance of the bamboo industry in Osun State, Nigeria. A 3-stage sampling technique was used to select 120 bamboo marketers. The data were analysed using descriptive statistics, market margin, Gini coefficient, factor analysis as well as multiple regression analysis. The result of the analysis showed that majority of the bamboo entrepreneur are young with 71.1% and 73.3% of the wholesaler and retailer between the age of 31 to 50 years respectively. The Bamboo market is efficient among wholesalers than retailers (71.0% and 62.7% respectively). Wholesalers had a market margin of N40,500 while retailers had a market margin of N10,800. The Lorenz curve showed that the bamboo market is probably competitive with income inequality closer to zero. The result also showed that age, marketing experience, innovation indices and marketing information are the factors that influence sustainable bamboo production. The poor transportation system, Lack of processing facilities and lack of policy to stimulate innovative development were the constraints facing the bamboo industry. The study recommends that innovation to improve the bamboo sector should be induced and there should be legal and institutional factors in place to control and enhance the bamboo industry for sustainable economic development.

Keywords: Bamboo, Marketing, Performance, Sustainability, Nigeria.

1.0 INTRODUCTION

Bamboo, regarded as 'The Green Gold' of the 21st century and commonly known as “timber”, played a substantial role in human society from the time immemorial. Today, it improves the subsistence needs of over a billion people worldwide (Salam, 2008). Dannenmann et al., (2007) reported that Asian countries experiences in the bamboo industry have shown that, it proved as valuable and sustainable natural resources. It has been used for different purposes such as environmental restoration,

production of handicrafts, artefacts and furniture, bamboo-ply, laminated boards, flooring, roofing sheets, props and many others (International Tropical Timber Organization, 2002).

Nigeria's industrial development policy is hinged on sustainable utilization of its locally available raw materials. However, due to overdependence on forest resources, research has shown imminent shortages of wooden raw materials supply to the wood products sector (Ogunwusi & Jolaoso 2012). Bamboo is generally recognized as a promising resource for sustainable development (Dannenmann et.al., 2007). Raw Materials Research and Development Council (RMRDC, 2004) reported that bamboo is distributed extensively in the south and middle belt regions of Nigeria. This distribution is associated to ecological conditions with the rainforest areas having the most abundant (Ogunwusi & Onwualu, 2011). Okwori, et al., (2013) reported that the abundant Bamboo species found in Nigeria has a fast growth rate of four to six years, growing to four feet in a day. Okwori, et al., (2013) further opined that the potential contribution of bamboo to sustainable natural resource management has not been recognized due to marketing constraints. Marketing of forest produce is of utmost importance in sustainable development of the value chain (Ogunwusi & Onwualu, 2011). Effective marketing could stimulate consumption of products which are essential to sustainable economic development (Haruna, et al., 2012).

Obasi (2008) reported that severe inefficiencies characterized the operation of the marketing system in most developing countries including Nigeria. These inefficiencies are results of little or no innovative development along the marketing value chain as well as lack of inclusive policies that facilitate innovative development of different sectors of the agricultural value chain (Astewel, 2010). Some of the problems associated with effective marketing of bamboo include tedious operations during harvesting, poor transportation from the rural to urban areas, and lack of proper storage facilities (Oso & Babalola, 2009). The lack of awareness about the potential of bamboo and its industrial applications has also been identified as one of the primary constraints inhibiting the bamboo-based industrialization process from taking shape (Oso & Babalola, 2009).

This study intends to investigate the conduct and performance of bamboo market; assess the market concentration of bamboo entrepreneur; analyse the status of sustainability in bamboo marketing; determine the factors influencing the sustainability of bamboo marketing; examine the attitude of the participant towards a sustainable bamboo plantation; and identify the constraints associated with bamboo marketing. A bamboo entrepreneur is defined as a person who owns bamboo based enterprise, purchase or resells bamboo. The result of this study will provide an insight into the proper usage of abundant bamboo as an alternative substitute to wood for the economic development of Nigeria and the development of all-inclusive

policy for forest products. It is envisaged that effective marketing and coordination of bamboo market will improve the livelihoods of the marketers, and ultimately contribute to the national income of Nigeria.

2.0 LITERATURE REVIEW

Different theoretical frameworks have been postulated by scholars for the study of marketing. These approaches include the functional approach, the institutional approach, the analytical approach, the problem identification approach, the commodity approach, the performance criteria approach and the structure conduct-performance approach (Admasu, 2000). However, Bartel (1968) proposed a general theory of marketing which integrate all other micro theories into marketing. Bartels (1968) proposes seven component sub-theories which integrates the general theory of marketing. The seven sub-theories include; theory of social initiative; theory of economic markets; theory of flows and systems; theory of behaviour constraints; theory of roles, expectations and interactions; theory of social change and marketing evolution and theory of social control marketing. This study is based on Bartel's general theory of marketing.

Marketing is a broad concept and it means different things to different people. Food and Agricultural Organisation (FAO, 2002) define marketing as the integrative force that matches production to consumer needs and is not an activity to which organisation turns its attention to at the end of the production phase of operations. Arowomole and Ebeleku (2004) defined marketing as the management process responsible for organizing and directing all those business activities. The concept of sustainable marketing becomes necessary to intensify efforts to eradicate rural poverty in achieving the United Nations Sustainable Development Goals 1 and 8. Sustainability in the concept of this study is defined as the ability of marketing actors to meet the need of their consumers without adverse effect on the environment (Praude & Bormane, 2014). The structure of the market, however, affect the marketing sustainability, hence, the market structure comprises of the characteristics of the organization of a market which seems to affect strategically the nature of competition and pricing within the market (Allen et al., 2005).

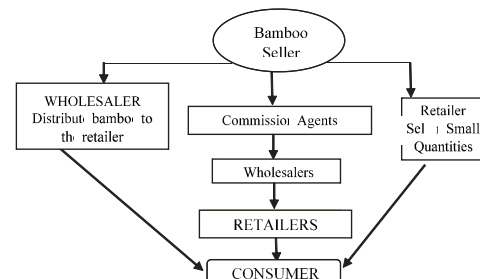


Figure 1: Structure of Bamboo Marketing

3.0 METHODOLOGY

This study was carried out in Osun State Nigeria. The state has a landmass of about 9,251 km². Osun State is sub-divided into three Federal Senatorial Districts, each of which is composed of two administrative zones. The state consists of thirty (30) Local Government Areas (LGAs) which is subdivided into three agricultural zones by Osun State Agricultural Development Project (OSSADEP). The rainy season is generally recorded between April and October, while the dry season is mostly experienced between November and March. The mean annual temperature for the state varies between 21.1°C and 31.1°C (Wikipedia, 2015). In term of Bamboo production, Osun state is the most endowed states (Ogunwusi & Jolaoso, 2012).

Sampling Techniques and Data Collection

Multi-stage sampling technique was used for this study. The first stage involved a selection of four local government areas. The second stage involved a purposive selection of two communities from each selected LGA due to the abundance of bamboo entrepreneur. The third stage involved a random selection of fifteen bamboo sellers which made up 120 bamboo sellers as the sample size for this study. Data were collected with the aid of a well-structured questionnaire. The researcher was assisted by well-trained enumerators.

Market performance is the appraisal of the interactions of buyers and sellers in a market. It is mainly the progressiveness of the bamboo entrepreneur in the industry. Due to its subjective nature, marketing margins and net returns are the main indicators for analysing market performance (Olukosi, 2005). The market performance was analysed using market margin and market efficiency, as adopted by Obasi et.al., (2008). Market margins according to Nicholson et.al., (2001) could be a reflection of high marketing costs, high-profit margin for wholesaler or retailers. The marketing costs and profits of market participants are both integrated. Marketing costs include all the expenses of making the product available from point of production to point of the final sale to consumers. Marketing costs in this study include; costs of processing, transportation costs, loading and offloading costs and the cost of handling at all levels of the marketing process.

Market Margin = Retail price – Farm gate price

Marketing Efficiency is defined as the maximization of the ratio of output to input (Olukosi et al., 2005). Marketing efficiency is calculated as

$$\text{Marketing Efficiency} = \frac{\text{Value added by marketing (Net profit)}}{\text{Total marketing cost}} \times 100$$

Value added by marketing activities = Selling price – Cost price, this can also be referred to as gross marketing margin.

$$\text{Therefore, Marketing efficiency} = \frac{\text{gross marketing}}{\text{Marketing Cost}} \times 100$$

Also, marketing efficiency is the measure of market performance, mathematically expressed as

$$ME = \frac{\text{Net margin}}{\text{Marketing Cost}} \times 100 \text{ efficiency}$$

Gini-coefficient Analysis

Gini coefficient refers to a number or an index varying between zero and one; zero implies perfect equality in distribution, while coefficient of one means perfect inequality in earnings. Gini coefficient method was adopted to measure the degree of seller concentration in the market. The Gini coefficient value lies between two extremes. The closer the value to unity, the greater is the degree of inequality and, therefore, the higher is the level of concentration. Higher concentration signifies that a market is monopolistic in nature with few individual controlling the market (Okereke et al., 1998). The Gini coefficient is a numerical representation, it showed the degree of inequality in the distribution. The method of elicitation is derived directly from the Lorenz curve. Gini coefficient was adopted by Adeleke et al. (2012) and given as equation (1):

$$G.C. = 1 - \Sigma XY \dots\dots\dots (1)$$

G.C. = Gini coefficient

X = Proportion of sellers

Y = Cumulative proportion of total sales/income

Σ = Summation of XY

Factor Analysis

Factor analysis was used to identify the variables contributing to the sustainability of bamboo marketing. Factor analysis is a methodology used to investigate whether a number of variables of interest $Y_1, Y_2, \dots, Y_k$ are linearly related to a smaller number of unobservable factors $F_1, F_2, \dots, F_k$.

$$Y_1 = b_{10} + b_{11}F_1 + b_{12}F_2 + \epsilon_1$$

$$Y_2 = b_{20} + b_{21}F_1 + b_{22}F_2 + \epsilon_2$$

$$Y_3 = b_{30} + b_{31}F_1 + b_{32}F_2 + \epsilon_3$$

Error terms ϵ_1, ϵ_2 , and ϵ_3

Y_1 = Environmental variable; Y_2 = Economic variable and Y_3 = Social variable

Multiple Regression Analysis

This was used to investigate the factors determining the attitude of participant towards a sustainable bamboo plantation. The model is specified below:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \epsilon$$

Where,

Y = Sustainability Index; X_1 = Age of marketers (years); X_2 = Education (years of formal schooling); X_3 = Years of experience, for bamboo marketing (years); X_4 = Membership of cooperative association (years); X_5 = Access to market information (dummy 1 = access, 0 = otherwise); X_6 = Gender (dummy 1 = male, 0 = female); X_7 = Marital status; X_8 = Average innovation indices; β_0 = constant term; $\beta_1 - \beta_8$ = coefficients for the respective variables in the regression model; ϵ = error term.

Sustainability Index (SI)

According to Hasnat (2006), SI is usually used to determine the current state of sustainability of a country, it also defines strong and weak sustainability condition, which is usually between 1 and 0. The Dow Jones Sustainability Indices (DJSI) measure the performance of the country in terms of economic, environmental and social criteria. Dow Jones (2016) grouped sustainability into *Low*, *Medium* and *High* and was adapted for this study.

$$\text{Sustainability index} = \frac{\text{Number of Question points received} \times \text{Question Weight}}{\text{Total Variable}}$$

Likert-Type Scale

A five-point Likert-type scale was used to analyse constraints encountered by bamboo marketers. The scale ranges from strongly agree = 5, Agree = 4, Neutral = 3, Disagree = 2 and Strongly Disagree = 1. These values when added give a value of 15, which will be divided by 5 to get a mean score of 3.0. The respondents' mean score will be obtained on each of the items. Any mean score = 3.0 will be regarded as being serious while any mean less than 3.0 will be considered as not.

4.0 RESULTS AND DISCUSSION

Table 1: Socioeconomic Characteristics of the respondents

Characteristics	Wholesalers N=90		Retailers N=30	
	Frequency	Percentage	Frequency	Percentage
Age				
Below 20	2	2.2	0	0.0
21-30	17	18.9	8	26.7
31-40	31	34.4	14	46.6
41-50	33	36.7	8	26.7
Above 51	7	7.8	0	0.0
Total	90	100.0	30	100.0
Gender				
Male	88	97.8	8	26.7
Female	2	2.2	22	73.3
Total	90	100.0	30	100.0
Marital Status				
Married	66	73.3	25	83.3
Single	17	18.9	3	10.0
Divorced	4	4.4	0	0.0
Widowed	3	3.3	2	6.7
Total	90	100.0	30	100.0
Educational Level				
No Formal Education	3	3.3	1	3.3
Primary Education	24	26.7	4	13.3
Secondary Education	52	57.8	22	73.3
Post-Secondary Education	11	12.2	3	10.0
Total	90	100.0	30	100.0
Marketing Experience				
2-8	39	43.3	22	73.3
9-15	39	43.3	6	20.0
16-22	9	10.0	2	6.7
23 and Above	3	3.3	0	0.0
Total	90	100.0	30	100.0
Primary Occupation (bamboo marketing)				
Yes	61	67.8	8	26.7
No	29	32.2	22	73.3
Total	90	100.0	30	100.0

Secondary Occupation				
Farmers	16	55.2	3	13.6
Wood sellers	1	3.4	2	9.1
Cocoa farmer	1	3.4	0	0.0
Poultry farmer	0	0.0	4	18.2
Trader	5	17.2	10	45.5
Electrician	2	6.9	0	0.0
Carpenter	2	6.9	1	4.5
Fish farmer	2	6.9	2	9.1
Total	29	100.0	22	100.0
Monthly Sales Income				
10000-20000	0	0.0	1	3.3
21000-30000	14	15.6	8	26.7
31000-40000	15	16.7	9	30.0
41000-50000	33	36.7	8	26.7
51000 and Above	28	31.1	4	13.3
Total	90	100.0	30	100.0

The result revealed that a larger percentage of bamboo marketers were young. As presented in Table 1, 36.7% and 26.7% of wholesalers and retailers respectively with ages between 41 and 50 years, while 34.4% and 46.6 % of wholesalers and retailers respectively were within the age range of between 31 and 40 years. The result revealed that all the wholesalers and retailers belong to the active segment of the population, which might have a positive effect on business. Majority of the wholesalers were male (97.8%) while the majority of the retailers were female (73.3%). This showed that both male and female are involved in bamboo marketing and also revealed the extent of the division of labour in the bamboo industries. Males probably dominated the wholesale side of the value chain due to the stress involved in the wholesale. About 73.3% and 83.3% of the wholesalers and retailers respectively were married. This reveals that marketers have a family responsibility to meet, hence their involvement in bamboo marketing. Education is very important in marketing because it influences decision-making process. From the result obtained, 57.8% of wholesalers and 73.3% of retailers had secondary education and only about 3.3% wholesalers and 3.3% retailers had no formal education. Marketing experience is high among the sampled wholesalers than retailers, bamboo marketing also represent the primary occupation of the wholesalers (67.8%) and farming represent the secondary occupation of the wholesalers (55.2%).

Bamboo marketing proved profitable in the study area as captured in the income generated by wholesalers and retailers.

*Market Conduct and Performance***Table 2: Market Conduct of Bamboo Marketers**

Characteristics	Wholesaler N=90		Retailer N=30	
	Frequency	Percentage	Frequency	Percentage
Restriction to Entry				
Yes	5	5.6	1	3.3
No	85	94.4	29	96.7
Total	90	100.0	30	100.0
Bamboo Association				
Yes	89	98.9	30	100.0
No	1	1.1	0	0.0
Total	90	100.0	30	100.0
Pricing Information				
Yes	59	65.6	22	73.3
No	31	34.4	8	26.7
Total	90	100.0	30	100.0

As presented in Table 2, 94.4% and 96.7% of wholesalers and retailers revealed that there is no barrier to entry into the bamboo business. They also reported that prices were determined by the forces of demand and supply. This presents an opportunity for the development of the bamboo marketing chain and the subsequent economic contribution to the industrial development of Nigeria. This also present an opportunity for bamboo entrepreneurs to enter into bamboo marketing to generate more income for the household. They also reported that there were no institutional factors governing regulations as well as entry and exit into the market. This possible present opportunity for exploitation of the fertile nature of the marketing chain in the short run. Information sharing is limited to the association of practising marketers. 65.6% and 73.3% of the wholesalers and retailers in the study area got their information from other bamboo marketers.

*Market Performance of Bamboo Marketing***Table (3): Marketing Margin of Bamboo Marketers.**

Marketing margin	Wholesalers Average Cost/15 (Naira)	Retailers Average Cost/ 800 (Naira)
Purchase Price of Bamboo (A)	0.00	44,000
Marketing cost		
Loading and Offloading	22,500	7500
Transportation	18,000	6000
Labour Cost	15,000	0.00
Fixed Cost		
Rent	0.00	1500
Sanitation Fee	0.00	1200
Security Fee	0.00	1000
Harvesting Fee	1500	0.00
Total marketing Cost(B)	57,000	17,200
Total Cost	51,500	61,200
Selling Price (C)	97,500	72,000
Gross Market margin (D) C-A	97,500	28,000
Marketing margin (Net marketing margin) D-B	40,500	10,800
Market Margin per stand	27.00	13.50

Table 3 showed that wholesalers had a marketing margin of N40,500 while retailers had a marketing margin of N10,800. This indicated that wholesalers in the marketing value chain are more profitable than the retailer. This may be as a result of the abundance of the bamboo in the study area. Wholesalers likely do not involve in processing before selling which possibly explains the higher gap in income. The finding also agrees with the findings of Erifo et al., (2016) and Gauli et al., (2018).

*Market Efficiency of Bamboo in the Study Area***Table 4: Market Efficiency of Bamboo in the Study Area**

Marketers	Estimates	Average Cost / 1500
Wholesalers	Value added(₦)	57,000
	Marketing efficiency (%)	40,500
	Marketing Cost (₦)	71%
Retailers	Value added(₦)	17,200
	Marketing efficiency (%)	10,800
	Marketing efficiency (%)	62.7%

The result in Table (4) showed the marketing efficiency of bamboo in the study area. The marketing efficiency of wholesaler was 71% while that of the retailer was 62.7%. This implies that the marketing of bamboo in the study area was efficient. This means the amount invested per unit of input in the wholesale business yield optimum income. This is more among the wholesalers compared to the retailers. This is against the findings of Mukul and Rana (2013) who found that retailers earn more than other Bamboo entrepreneurs in the marketing chain in Bangladesh

Market Structure of Bamboo (Gini-Coefficient Analysis)

Figure 2 and Figure 3 showed the Lorenz curves which graphically depict the nature of seller concentration that was quantitatively analysed using the Gini coefficient. For the wholesalers, the value of Gini coefficient (0.18) is close to Zero indicating a smaller income inequality. Further, from the Lorenz curve, the extent of deviation of the curve from the line of equality shows a perfect market competition (18% Gini). For the retailers, the Lorenz Curve is closer to the line of Equality, having a smaller Gini coefficient of 0.17, which also indicate that the market could be purely competitive. This nearly perfect competition likely suggests that the price of bamboo in the market will be controlled by the forces of demand and supply. This is a good reflection for a developing industry where bamboo entrepreneur will not rip one another off. This result is not in agreement with the findings of Erifo et al., (2016) who found that Bamboo marketing in Ethiopia is oligopolistic in Nature.

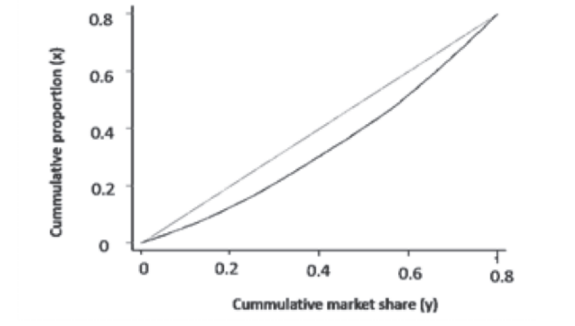


Fig 2: Lorenz Curve for wholesalers
retailers

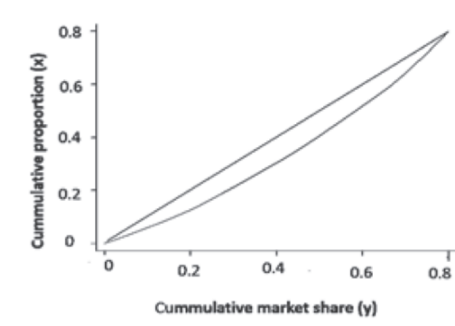


Fig 3: Lorenz Curve for
retailers

Sustainability of Bamboo Marketing (Factor Analysis Result)

Table 5: Communalities of wholesalers and Retailers

Variables	Wholesalers		Retailers	
	Initial	Extraction	Initial	Extraction
No Bush burning	1.000	0.801	1.000	0.917
Bamboo Regenerate naturally	1.000	0.750	1.000	0.639
Afforestation	1.000	0.706	1.000	0.706
Access to quality bamboo	1.000	0.786	1.000	0.786
No Accessibility to agricultural machinery	1.000	0.553	1.000	0.553
Access to Market channels	1.000	0.674	1.000	0.674
Investment in bamboo issues	1.000	0.586	1.000	0.586
Access to bamboo for harvesting	1.000	0.614	1.000	0.614
No socio-economic value of the product	1.000	0.655	1.000	0.655
Proper regulation on exploitation	1.000	0.643	1.000	0.643
No knowledge on management of natural stand	1.000	0.606	1.000	0.606
Use of extension Agents	1.000	0.734	1.000	0.734
No use of communication channel	1.000	0.433	1.000	0.433

Extraction Method: Principal Component Analysis.

There are various variables affecting the sustainability of the bamboo market. The variables were subjected to factor analysis. No bush burning, Bamboo regenerates naturally and access to quality bamboo is significant for the wholesalers while no bush burning, access to quality bamboo and use of extension agents were significant for the retailers. The result is presented in Table 5

Table 6: Total Variance Explained (Wholesalers)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.861	14.318	14.318	1.861	14.318	14.318
2	1.611	12.389	26.707	1.611	12.389	26.707
3	1.395	10.727	37.434	1.395	10.727	37.434
4	1.334	10.258	47.693	1.334	10.258	47.693
5	1.196	9.200	56.893	1.196	9.200	56.893
6	1.144	8.801	65.694	1.144	8.804	65.694
7	.900	6.923	72.617			
8	.764	5.880	78.497			
9	.680	5.229	83.726			
10	.631	4.853	88.579			
11	.593	4.562	93.140			
12	.504	3.876	97.016			
13	.388	2.984	100.000			

Extraction Method: Principal Component Analysis

Table 7: Total Variance Explained (Retailers)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative%
1	3.103	23.867	23.867	3.103	23.867	23.867
2	2.231	17.160	41.027	2.231	17.160	41.027
3	1.870	14.382	55.409	1.870	14.382	55.409
4	1.514	11.650	67.059	1.514	11.650	67.059
5	1.168	8.986	76.045	1.168	8.986	76.045
6	.741	5.702	81.746			
7	.671	5.162	86.908			
8	.553	4.254	91.162			
9	.414	3.188	94.350			
10	.306	2.354	96.704			
11	.247	1.897	98.601			
12	.123	.942	99.543			

Extraction method: Principal component Analysis***

Table 8: Rotated Component Matrix

Variables	Components (Wholesalers)						Components (Retailers)				
	1	2	3	4	5	6	1	2	3	4	5
No bush Burning		-		.12	-	-	-	-	-	-	.35
	.013	.14	.85	5	.13	.122	.49	.23	.49	.49	6
		9	4		6		5	5	5	4	
Bamboo regenerate naturally Afforestation	-	.3	-			-	-		.62	-	-
	0.59	36	.107	.27	.73	.056	.29	.26	6	.264	.158
				2	9		1	2			
			-	-	-	-		.05	-	.64	.53
	.817	.14	.03	.096	.01	.081	.16	5	.02	2	3
		6	8		6		2		3		
Access to quality Bamboo	-	-	-	.15	.		.12	-	.21	.05	.30
	.110	.00	.072	4	07	.860	4	.69	6	1	8
		5			2			4			
No Accessibility to agricultural machinery	-			-			.18	-	-	.067	.792
	.055	.26	.635	.116	.17	.184	1	.07	.06		
		2			5			5	0		
Access to market channel			-		.2		.83	.04	.03	-	.060
	.236	.023	.124	.707	47	.201	8	9	1	.386	
Investment in bamboo issues				-	-		.28	.36	-	.272	-
	.046	.570	.234	.429	.08	.579	1	6	.41		.600
					3				6		

Access to bamboo for harvesting	-						.11	-	.88	.185	.135
	.129	.033	.164	.72	.17	.107	7	.16	5		
				7	3			9			
No socio economic value of the product	-	-	.24	-	-	-	.62	.43	-	-	.016
	.021	.745	0	.15	.03	.123	3	1	.47	.003	
				9	3				1		
Proper regulation on exploitation		-		.15		-	.36	.68	.02	.064	-
	.711	.273	.174	3	.05	.080	5	0	6		.413
					4						
No knowledge on management of natural stands		-	.14	-	-	-	-	.27	.01	-	-
	.012	.725	9	.190	.00	.147	.73	7	5	.315	.035
					9		6				
Use of Extention Agents	-	-		-		.089	-	.85	.11	-	.141
	.019	.300	.109	.19	.76		.07	8	5	.051	
				6	5		8				
No use of communication channel	-	-		-		.201	.02	-	.02	.813	-
	.509	.008	.322	.00	.17		1	.07	5		.052
				3	4			7			

Extraction Method: Principal Component Analysis Rotation Method: Varimax with Kaiser Normalization

Principal Component Analysis (PCA)

PCA was used to extract the component from the variable data. The sum of all Eigen values is equal to the total number of variables. Kaiser's rule was used to determine which component were most eligible for interpretation. Kaiser criterion suggests that those factors with Eigen values equal or higher than 1 be retained and as such six components and five components were retained for both wholesalers and retailers as shown in Table 6 and Table 7 respectively. They are capable of explaining roughly 65.7% and 76 % of all the variable variances for wholesalers and retailers respectively. The PCA was used to extract the indices used for the sustainability of bamboo marketing in the study area.

The Rotated Component Matrix (Table 8) was used to select between the important and the less important indices for the sustainability of bamboo marketing. To know between the important and less important, a value of 0.4 and above is the basis. Any variable with a value of 0.4 and above is considered to be less important or negligible. For the wholesalers, afforestation and proper regulation on exploitation loaded strongly on factor 1, no socio-economic value of the product and no knowledge on the management of natural stand loaded strongly on factor 2 while no bush burning and no accessibility to agricultural machinery loaded strongly on factor 3. Also for the retailers, access to market channel and no socio-economic value of the product loaded strongly on factor 1, proper regulation on exploitation and use of extension

agents loaded strongly on factor 2. This method was also used by Muema et.al., (2018) in Measuring Performance of Public Irrigation Schemes in Kenya

KMO and Bartlett's Test of Result of PCA

Kaiser-Meyer-Olkin measure of sampling adequacy were 0.689 for the bamboo wholesalers and 0.604 for retailers. These were above the recommended value of 0.6 by the Kaiser-Meyer-Olkin measure. Bartlett's test of sphericity was significant ($X^2(78) = 127.651, p < .05$) for wholesalers and ($X^2(78) = 118.090, p < .05$) for retailers. This showed that the PCA is adequate for the selection of sustainability indices used in the study (Muema et.al., 2018).

Sustainability Index

For the study, the indices of sustainability were grouped into 3 categories; Low (0.1 - 0.3), Medium (0.4 - 0.6) and High (0.7 - 1.0). On the part of the wholesalers, it was observed that the index ranges from 0.54 - 0.79, on the average, average sustainability index of 0.63 was recorded which falls in between the medium group. For the retailers, sustainability ranges between 0.58 - 0.71. On average, the sustainability index 0.60 were recorded, which falls in between the medium group. This implies that both the wholesalers and retailers market actors' activities are averagely sustainable in their marketing activities. This probably means there are opportunities for people in the bamboo marketing value chain.

Perception of Respondents towards Sustainable Bamboo Production

Table 9: Perception of Respondents towards A Sustainable Bamboo Plantation

Attitude	Perception	Wholesalers	Retailers
There is regulation on the harvesting of bamboo	Strongly Agree	2(2.2)	0(0.0)
	Agree	2(2.2)	1(3.3)
	Undecided	12(13.3)	0(0.0)
	Disagree	54(60.0)	12(40.0)
	Strongly Disagree	20(22.2)	10(33.3)
	Total	90(100)	30(100)
Bamboo regenerate itself naturally without planting	Strongly Agree	76(84.4)	25(83.3)
	Agree	6(6.7)	5(16.7)
	Undecided	1(1.1)	0(0.0)
	Disagree	2(2.2)	0(0.0)
	Strongly Disagree	5(5.6)	0(0.0)
	Total	90(100)	30(100)

There is government policy towards bamboo plantation	Strongly Agree	3(3.3)	1(3.3)
	Agree	20(22.2)	6(20.0)
	Undecided	13(14.4)	4(13.3)
	Disagree	24(26.7)	7(23.3)
	Strongly Disagree	30(33.3)	12(40.0)
	Total	90(100)	30(100)
There is no government policy on the marketing of bamboo	Strongly Agree	35(38.9)	14(46.7)
	Agree	32(35.6)	9(30.0)
	Undecided	17(18.9)	5(16.7)
	Disagree	5(5.6)	2(6.7)
	Strongly Disagree	1(1.1)	0(0.0)
	Total	90(100)	30(100)
There is no development towards bamboo plantation in the state	Strongly Agree	32(35.6)	11(36.7)
	Agree	35(38.9)	12(40.0)
	Undecided	13(14.4)	4(13.3)
	Disagree	10(11.1)	3(10.0)
	Strongly Disagree	0(0.0)	0(0.0)
	Total	90(100)	30(100)
Bamboo is replanted after harvesting	Strongly Agree	1(1.1)	0(0.0)
	Agree	0(0.0)	0(0.0)
	Undecided	0(0.0)	0(0.0)
	Disagree	7(7.8)	2(6.7)
	Strongly Disagree	82(91.1)	28(93.3)
	Total	90(100)	30(100)

Perception of respondents on the sustainability of bamboo plantation is presented in Table 9. The result of the perceptions of bamboo entrepreneur in the value chain revealed that there is no regulation on the harvesting of bamboo. This can also mean the innovative harmonization of the bamboo harvesting with the policy not in place by the Nigerian authority which over 60% of the bamboo entrepreneur agree to. The majority (90%) of the bamboo entrepreneurs also have a general consensus that bamboo regenerates itself naturally without planting. This probably also showed that no conscious effort exists on the part of the bamboo entrepreneurs to ensure the sustainable development of bamboo production in the study area. Bamboo entrepreneurs agree that there should be government intervention in the bamboo value chain (especially in replanting and harvesting regulations) which will facilitate innovative development of this sector of the economy for sustainable development.

Factor influencing Sustainability of Bamboo Marketing.**Table 10: Regression Estimates of Factors influencing and sustainability**

Variable	Coefficient	Standard Error	t-Value
(Constant)	.532***	.076	7.046
Sex	.009	.012	.714
Age	.013*	.008	1.662
Marital status	-.009	.009	-1.032
Educational Status	.008	.007	1.153
Marketing Experience	.021***	.006	3.224
Cooperative	-.012	.024	-.503
Market information	.019**	.008	2.375
Innovation indices	0.001**	.024	0.85

*** Significant at 1% ** Significant at 5% * Significant at 10%

Socio-economic factors that probably influence the sustainability of bamboo marketing was used as an independent variable to investigate factors that influence the sustainability of bamboo marketing. These factors were captured in Table 10. The result showed that the age of the marketers was significant at 10% had positive influence on sustainability. Age is very vital in marketing activities because it determines the physical strength of the Bamboo entrepreneurs. Young people also tend to withstand stress and may be willing to take the risk associated with marketing. Years of marketing experience was positive and significant at 1%. This implies that an increase in years of experience would increase the sustainability of bamboo marketing. Experience is needed in the way the bamboo plantation is managed to ensure that the plantation is not totally depleted. The result of the study further revealed that access to market information was significant at 5% and had a positive influence on the sustainability of bamboo marketing. Information pertaining to the market price, market potentials, institutional related regulations are important to the management of the plantation to ensure the sustainability of bamboo marketing. Innovations and technology are important to ensure the development of any industry. The significance of the innovation indices showed that with innovation, bamboo marketing could be sustainable to ensure the contribution of the bamboo industry to national development.

Constraints related to Bamboo Marketing**Table 11: Problems associated with Bamboo Marketing**

Constraints	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Weight Score	Mean Index	Rank
Transportation	3(2.5)	1(0.8)	0(0.0)	27(22.5)	89(74.2)	558	4.65	1 st
Lack of processing facilities	1(8)	8(6.7)	13(10.8)	39(32.5)	59(49.2)	507	4.23	2 nd
Lack of government policy	3(2.5)	2(1.7)	15(12.5)	60(50.0)	40(33.3)	492	4.10	3 rd
Communication between the buyers and sellers	3(2.5)	11(9.2)	29(24.2)	62(51.7)	15(12.5)	435	3.63	4 th
Annual bush burning	7(5.8)	13(10.8)	9(7.5)	80(66.7)	11(9.2)	434	3.62	5 th
Unavailability of bamboo	6(5.0)	82(68.3)	16(13.3)	13(10.8)	3(2.5)	285	2.38	6 th

Of all the marketing constraints itemized, transportation ranked the first. Poor transportation system is as a result of the high cost of petrol, diesel, and bad roads both within and outside the study area. Lack of facilities for processing of bamboo product ranked second while lack of government policy to stimulate innovative development of the bamboo industry ranked third in the list of the constraints.

5.0 CONCLUSION AND RECOMMENDATIONS

The poor transportation system, lack of processing facilities and lack of policy to stimulate innovative development were the constraints facing the bamboo industry. There are no institutional factors in place to facilitate the efficient marketing of bamboo in Nigeria. However, the bamboo industry is market efficient and can contribute to the economic sustainability of the local people in Nigeria. The study recommends that there should be legal and institutional factors in place to control and enhance the bamboo sector of the economy for sustainable economic development.

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