Determinants of Market Orientation among Cassava Producing Households in Southeast, Nigeria

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Abstract
The study analyzed empirically factors that influence market orientation among Cassava Producing households in Southeast, Nigeria. A well-structured questionnaire was used to elicit data from the respondents to actualize these two objectives: (1) determinants of market orientation among smallholder cassava farmers in Southeast Nigeria and (2) constraints militating against market orientation. A multi-stage randomized sampling procedure was used to select 192 respondents, and data collected were analyzed using descriptive statistics such as; frequencies, percentages, and means, as well as PCA (principal component analysis) and Ordinary Least Square (OLS) regression model. The results of the Cobb Douglas function in the pooled data showed that, income, market information, distance, and credit availability were significant at 1% each, while farm size and cooperative membership were significant at 5%, then educational level at 10% with R^2 value of 0.906 indicating that about 91% of the variation in the dependent variable was explained by the independent variables included in the model and F-ratio which is significant at 1% showed the goodness of fit of the overall model. The study recommended that concerted effort is required for self capital development in order to speed up slow process of cassava market orientation by encouraging youths to get fully involved. There is need to encourage commercial production of cassava as subsistence management cannot sustain the increasing population. Higher-income earning farmers may be less risk averse and have more access to information. Capital needs to be made available via credit facilities which cassava farmers can have access to without the burden of collateral. Majority of root and tuber crop farmers have not been able to access credit facilities easily, therefore, it is recommended that policies aimed at providing credit to farmers should be made available to avoid farmers borrowing money from the lenders at high interest rate. It is regularly hypothesized that the adoption of better market orientation strategies requires sufficient financial well-being. Efforts at mobilizing farmers into viable cooperative groups should also be pursued vigorously. This will help mobilize rural savings that can be readily available to the farmers. Farmers, if capacitated financially can easily afford necessary inputs to improve their production. Farm size is associated with greater wealth. It will increase farmers' production thereby enhancing market oriented production.

Keywords: Determinants, market, orientation, cassava

Introduction
Promoting market orientation among agricultural producers and the smallholder farmers in developing countries is the focal point for developing effective agribusiness value chains that will supply adequate food. This market orientation will involve improving the production and marketing system and capacity for income generation among resource-poor farmers (Anyaegbunam *et al.* 2010). Market orientation philosophy is a dynamic and efficient way of increasing and enhancing productivity in the entire sector. Moreover, market orientation practices can aid globalization (Idachaba, 2000). Market-oriented production in practice can respond adequately to the needs of the domestic economy, increase market shares of all world export markets and ward off competition from imports of agricultural products. This benefits of market orientation are true because efficient market oriented production in practice could guide farmers towards new productivity opportunities such as crops with high productivity potential, incorporating varieties and initiation of programmes that will reduce crop failure; encourage adoption of modern and better practices and improvement in response to demand and

price changes; create and stimulate new demand by improving and transforming farm produce into different varieties which are attractive and convenient to the consumers (Atuahene *et al*., 2005). The problem of how to produce beyond domestic demand and sustain supply to the international markets is one of the challenges most countries have been trying to solve for four decades (Baker and Sinkula, 2005). However, experts have opined that countries with enduring institutional structure to sustain cassava production have continually increased their participation as economic agents at the world cassava market. Therefore, it is very expedient to look at the determinants of market orientation among cassava farmers in Nigeria's rural and urban sectors.

Methodology
The study was in Abia and Enugu States of Nigeria, located in the Southeast geopolitical zone of the country; Abia and Enugu are two states among the 36 states of the Federal Republic of Nigeria. Abia State lies between longitude $04^{o}45$ and $06^{0}07$ North and latitude $07^{o}00$ and $08^{o}10$ East. It is bounded by Imo State on the West, Ebonyi and Enugu States on the North, Cross River and AkwaIbom States on the East, and Rivers State on the south. Its population density is 580 persons per square kilometer and a population of 3,727,300 persons (NPC, 2016). Enugu State shares borders with Abia State and Imo State to the South, Ebonyi State to the East, Benue State to the Northeast, Kogi State to the North West, and Anambra State to the West. The State is located in a tropical rainforest zone with a humid climate. Multistage random and purposive sampling techniques were adopted in the selection of respondents (cassava farmers). The two States are made up of 17 Local Government Areas (LGAs) each. In the second stage, two agricultural zones per State were randomly selected. They were; Umuahia and Ohafia for Abia State, Enugu North, and Enugu East for Enugu State, giving a total of four agricultural zones. In the third stage, four LGAs were selected randomly from each zone viz; Umuahia North, Umuahia South, Ikwuano and Bende LGAs for Abia State, Nsukka and Udenu North LGAs for Enugu North, Isi-Uzor, and Enugu East, giving a sample of eight LGAs. In the fourth stage, one community was randomly selected from each LGA, giving eight communities. One village was purposively selected from each community, making a total of eight villages. Finally, twenty-four cassava farmers were randomly selected from each village. This selection gave a total of 192 respondents for detailed study. The Ordinary Least square multiple regression model estimated is explicitly stated as follows:

$MOI = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} e_i$

Where;
MOI = Market orientation Index

$$MOI = \sum \frac{\alpha i \, Li}{LT} \ldots (1)$$

Where,
MOI_i is market orientation index of household, L_i is amount of land allocated to root and tuber crops, L^T is the total crop land operated by farmer I, α_i is the proportion of cassava sold (marketability index, α_i) as;

$$\alpha i = \left. \sum_{i=1}^{N} Si \middle/ \sum_{i=1}^{N} Qi \right.$$

$$Q_i \geq S_i \text{ and } 0 \leq \alpha_i \leq 1 \ldots\ldots (2)$$

Where, S_i = the proportion of cassava sold
Q_i = total amount produced aggregated over the total sample households in a farming system. α takes a value between 0 and 1, inclusive. Crops mainly produced for markets usually have α value closer to 1. The higher proportion of land a farmer allocates to the more marketable crop, the more the household is market oriented (Gebremedhin *et al*., 2010)
β_0 = Constant
β's = Parameters estimated (regression coefficients explaining changes caused in MOI by changes in the independent variables $X_1 - X_{13}$)
$X_1, X_2 \ldots X_{13}$ = Explanatory variables that affect the level of market orientation
e_i = Sochastic error term.
Where;
X_1 = Age of household (years)
X_2 = Educational level (years)
X_3 = Gender (dummy, male = 1, female = 0)
X_4 = Household size (number)
X_5 = Farm size (hectare)
X_6 = Membership of co-operative or any agricultural association (dummy member, yes = 1, no=0)
X_7 = Farm Income (N)
X_8 = Access to market information (dummy member, yes = 1, no=0)
X_9 = Distance (km)
X_{10} = Extension contact (Number)
X_{11} = Availability of Credits (Number)
X_{12} = Non-farm income (N)
X_{13} = Capital Invested (N)

Principal component factor analysis with Varimax – rotation and factor loading of 0.30 was used. Hence, variables with a factor loading of less than 0.30 and variables loaded in more than one factor were discarded (Ashley *et al*., 2006). The principal component factors analysis model was stated thus:

$Y_1 = {}^a_{11}X_1 + {}^a_{12}X_1 + {}^a_{13}X_2 + \ldots {}^a_n X_n$
$Y_2 = {}^a_{21}X_1 + {}^a_{22}X_1 + {}^a_{23}X_1 + \ldots {}^a_{2n}X_n$
.
.
$Y_3 = {}^a_{31}X_1 + {}^a_{32}X_1 + {}^a_{33}X_1 + \ldots {}^a_{3n}X_n$
$Y_n = {}^a_{n1}X_1 + {}^a_{n2}X_1 + {}^a_{n3}X_1 + \ldots {}^a_{nn}X_n$

Where; $Y_1, Y_2 \ldots Y_n$ = observed variables/constraints of market orientation
${}^a_1 - {}^a_n$ = Factor loadings or correlation coefficient
$X_1, X_2 \ldots X_n$ = Unobserved underlying factors constraining market orientation

Results and Discussion
Socioeconomic characteristics of the root and tuber crop farmers
The result in Table 1 shows the socioeconomic characteristics of cassava producers in Southeast geopolitical zone of Nigeria. Results showed that respondents had a mean age of 44.71years in Abia and 47.36 years in Enugu with an average household size of about six persons each. This result implies that the majority of the respondents were young and capable of accepting innovations. This result is in line with Enwelu *et al.* (2014), who noted that the respondents involved in cassava production were in their active years and could meet market demand. The large household size is attributed to the need for cheap and dependable labour derivable for on-farm and off-farm activities. The result also showed that Abia and Enugu farmers attained secondary education with a mean score of 12.24 and 12.33 years respectively. This result implies that majority of them are literate, in line with the findings of Onubuogu and Onyeneke (2012) who posited that education and training enhance farmers' productivity and market-oriented production. Also, the respondents had a mean farming experience of 11 years. This result agrees with the findings of Omonona *et al.* (2010) who reported that farmers' level of experience in the production of a particular commodity is one of the determinants of their ability to maximize output using available inputs. The average amount of capital invested by Abia and Enugu farmers was N83,687 and N104,729/ha, respectively. This average amount of capital invested may be the reason area cultivated by Abia State farmers was generally low (0.80/ha less than one hectare of land with a smaller income). The distance from the farm to the market where farmers sell the produce was 6.71km and 7.51km, with transportation costs of N214.68 and N138.43 for Abia and Enugu respectively, implying long distance for the farmers. The cost of transportation is relatively high, probably due to the bulky nature of root and tuber crops. Furthermore, the mean income of the farmers for Abia and Enugu was N43,634 and N55,728, while non-farm income was N41,873 and N50,670 respectively. Hunt and Morgan (1995) noted that farmers in Africa have demonstrated that when allowed to earn higher income, they can be dynamic producers. Majority of the farmers indicated credit availability, but limited access to credit facilities. Majority indicated membership of cooperative societies, which grants them access to market information. According to Onubuogu and Onyeneke (2012), membership in a cooperative society provides farmers the opportunity to share information on new findings or innovations. In terms of access to market information, a total of 69% of the respondents agreed that they are adequately informed. Also, a total of 58% of the respondents had been visited by extension agents in the last one year. This result indicates that majority of the farmers are aware of the innovative market orientation techniques, which may enhance their income. Furthermore, Nwakor *et al.* (2016) reported that contact with extension agents expose farmers to new technologies and improved varieties of inputs.

Male dominance (64%) suggests that root and tuber crop production is gender sensitive and requires physical force. This result is in agreement with Anyiro *et al*. (2013). Majority (90.6%) of the respondents were married, implying that most of the married were among the households that produce root and tuber crops to increase their income and experience. This result agrees with the findings of Ikwuakam (2013), who noted that most root and tuber crop farmers, processors, and marketers in Southeast Nigeria were married.

Determinants of Market Orientation among cassava farmers in Southeast, Nigeria
Table 2 shows the OLS regression estimates of the determinants of market orientation showed in the pooled result of the double log functional form with R^2 value of 0.906 and an F ratio of 118.566, significant at the 1% level was chosen as the lead equation. The R^2 values of 0.443, 0.778 and 0.906 implies that about 44%, 78% and 91% of the variation in the dependent variable were explained by changes in the independent variables and the F-ratio which were significant at 1% shows the goodness of fit of the overall model. The coefficient for the educational level was positive and significant at the 10% for the pooled result. Individuals with higher educational attainment are usually faster in adoption of market orientation methods (Chukwu, 2015 and Esiobu and Onubuogu, 2014). The coefficient of cooperative membership was positive and significant at a 5%. This result implies that farmers in the study area belong to cooperative groups that expose them to market information. It is expected that membership of cooperative society will enhance farmers participation in marketing activities in the area, this findings agree with the earlier findings of Martey *et al.,* (2013) which posits that membership of association/group increases access to information important to production and marketing decisions. Most farmer groups engage in group marketing as well as credit provision for their members. It is therefore expected that household membership of association/group will positively impact on market orientation. The coefficient for income was positive and significant at 1%; income received associated with inputs and farmers' well-being is expected to encourage market orientation. The coefficient for educational level was positive and significant at the 10% which indicates that a unit increase in education level will lead to 0.183 increase in market orientation, this is in agreement with the earlier findings of Chukwu (2013), Esiobu and Onubuogu (2014) who reported that individuals with higher educational attainment are usually faster in adoption of market orientation methods. The findings signified that the farmers have minimal educational background that is relevant for being market oriented. It is expected that educational attainment will contribute significantly to decision making of a farmer for being market oriented. The income of farmers at 1% significant level indicates that increase in income received will lead to increase of being market oriented for the famers. The income received associated with the procurement of inputs and farmers' well-being is expected to encourage market

orientation. The coefficient for credit availability was positive and significant at 1%. This is in line with the *a priori* expectations probably because availability of credit and the associated cost of credit according to Sindi (2008) are crucial in the success of the agricultural industry. Credit could be used to purchase inputs (planting material, fertilizer and seeds), pay wages, invest in machinery, or to smooth consumption. The availability of credit is expected to lead to increased agricultural productivity and greater market orientation.

Constraints Militating against Cassava Production
The varimax-rotated factors militating against cassava production in the area studied are shown in Table 3. Three factors were extracted based on the farmer's response. Only variables with factor loadings of 0.30 and above at 10% overlapping variance (Amusa *et al*., 2011) were used to name the factors, while variables with factor loadings of less than 0.30 were not used. However, each factor was given a denomination based on the set of variables or characteristics. Some of the constraining factors among the farmers in Abia State were: Prevalence of pests and diseases (0.791), high production cost (0.598), and inadequate marketing channel (0.833). Variables that loaded under factor 2 (Techno-infrastructural factor) include; poor processing facilities (0.468), poor road network (0.479), and poor storage facilities. For factor 3, low production capital (0.414) and land tenure (0.590) loaded. For Enugu State, factors that loaded were; high labour cost (0.796), prevalence of pests and diseases (0.810), inadequate marketing channel (0.832), high production cost (0.592), and insufficient extension services (0.343). Variables that loaded under factor 2 (Techno-infrastructural factor) were: poor storage facilities (0.421) and low access to mechanized services (0.632); under factor 3 (socio-financial factor) were: low production capital (0.414) and land tenure (0.590). The

traditional land tenure system hinders the outcome of sustainable agriculture, with peasant associations responsible for allocating land to residents, according to Okoye *et al.* (2008). However, the land tenure system is a significant constraint that the Southeastern farmers are facing.

Conclusion
Based on the findings of the study, it could be concluded that the market orientation of cassava production in the study area was low; however, it is recommended that concerted effort is required for self capital development in order to speed up slow process of cassava market orientation by encouraging youths to get fully involved. The government or any other agency should encourage commercial production of cassava as subsistence management cannot sustain the increasing population. Higher-income earning farmers may be less risk averse and have more access to information. Capital needs to be made available via credit facilities which cassava farmers can have access to without the burden of collateral. Majority of root and tuber crop farmers have not been able to access credit facilities easily, therefore, it is recommended that policies aimed at providing credit to farmers should be made available to avoid farmers borrowing money from the lenders at high interest rate. It is regularly hypothesized that the adoption of better market orientation strategies requires sufficient financial well-being. Efforts at mobilizing farmers into viable cooperative groups should also be pursued vigorously. This will help mobilize rural savings that can be readily available to the farmers. Farmers, if capacitated financially can easily afford necessary inputs to improve their production. Farm size is associated with greater wealth. It will increase farmers' production thereby enhancing market oriented production.

Table 1: Average Socioeconomic Characteristics of cassava Farmers in Enugu

Variable Description	Abia	Enugu	Pooled
No of Observation	96	96	192
Age	44.71	47.36	46.04
	(14.1)	(15.25)	(14.75)
Household size	5.51	6.08	5.79
	(2.50)	(3.09)	(2.82)
Educational Level (Years)	12.24	12.33	12.78
	(2.76)	(3.68)	(3.28)
Farming Experience	10.15	11.20	11.18
	(3.06)	(1.48)	(2.40)
Capital invested (N)	83,687	104,729	94,208
	(67594.82)	(103666.5)	(87915.1)
Farm Size	0.80	4.15	3.09
	(0.50)	(3.06)	(2.59)
Transportation Cost	214.68	138.43	71.07
	(237.28)	(127.92)	(112.7)
Distance from the Farm to the market(km)	6.71	7.51	7.48
	(1.19)	(7.72)	(7.70)
Income	43,634	55,728	71,455
	(42933.2)	(22061.74)	(83431.64)
Non-farm income	41,873	50,670	62,659.69
	(51079.88)	(74063.24)	(65055.56)
Dummy (%)			
Credit Availability	72.92	95.83	55.21
Member of Cooperative Society	83.33	78.13	52.60
Access to Market Information	61.46	85.42	69.79
Extension contact	67.71	77.08	58.85
Gender	51.04(m)	62.50(f)	64.06(m)
Marital Status	81.25	88.54	88.54

Source: Field Survey, 2018
Note: Values in Parenthesis are Standard Deviation

Table 2: Determinants of Market Orientation among cassava farmers in South Eastern, Nigeria

Variable	Parameter	Abia Exponential	Enugu Linea	Pooled Double-log
Age	X_1	34.884 (3.021)**	1.922 (2.039)*	0.078 (0.739)
Educational Level	X_2	4.486 (1.345)	6.988 (1.039)	0.183 (1.992)*
Gender	X_3	-0.488 (-0.096)	-68.174 (-2.075)*	0.075 (1.093)
Household size	X_4	16.979 (1.610)	-5.661 (-0.593)	0.208 (1.453)
Farm size	X_5	-8.086 (-1.087)	19.002 (-1.220)	-0.220 (-2.172)**
Cooperative membership	X_6	20.755 (2.43)**	13.186 (3.128)***	0.275 (2.470)**
Income	X_7	21.428 (3.466)***	0.033 (10.413)***	0.703 (7.951)***
Market information	X_8	5.733 (1.036)	40.470 (0.965)*	0.473 (6.78)***
Distance	X_9	-7.241 (-1.376)	-51.290 (-1.103)	0.594 (6.78)***
Extension contact	X_{10}	3.287 (0.487)	103.316 (1.866)*	0.126 (1.201)
Credit availability	X_{11}	13.923 (2.109)*	88.402 (1.896)*	0.501 (6.363)***
Non-Farm Income	X_{12}	0.753 (0.405)	4.209 (0.286)	0.013 (0.472)
Capital Invested	X_{13}	-0.179 (-1.074)	-2.237 (0.064)	0.006 (0.084)
Constant	β_0	642.499 (4.166)***	-154.291 (-1.629)*	0.784 (0.794)
R^2		0.443	0.778	0.906
Adjusted R^2		0.342	0.743	0.899
F ratio		4.400***	21.877***	118.566***

Source: Field Survey data, 2018
*Note: ***, ** and * implies statistically significant at 1%, 5% and 10% levels respectively.*
Values in parentheses represent the t-values.

Table 3: Varimax –rotated Factors Militating Against Market Orientation among cassava Farmers in the Study Area

S/N	Constraining Variables	(F1) Economic/Institutional	(F2) Techno-Infrastructural	(F3) Socio-Financial
1	High Labour Cost	**-.796**	.069	-.089
2	Low Production Capital	-.011	-.196	**-.414**
3	Poor Processing Facilities	.133	-.017	-.272
4	Poor road network	.135	.468**	.331**
5	Prevalence of Pest and Diseases	**-.810**	.067	-.010
6	Inadequate Marketing Channel	**-.832**	-.251	-.123
7	Low access to farm input	-.038	.362	.247
8	High Production cost	**-.592**	.071	-.051
9	Poor yield	.471**	-.352**	.228
10	Poor storage facilities	.286	**.421**	-.122
11	Long distance	-.456**	-.471**	-.062
12	Low Access to Mechanized Services	.175	**.632**	-.278
13	Land tenure	-.182	.023	**.590**
14	Extension Services	**.313**	.024	-.091
15	Low Access to Credit	-.037	-.150	-.102
16	Post-harvest loses	.202	-.027	.171
17	High transportation cost	.036	-.101	-.035
18	Lack of improved planting materials	-.173	.057	.047

Source: STATA 13 Results
*Note: F1…F3 = Factors 1 – Factors 3, Factor loading of 0.30 is used at 10% overlapping variance. Variables with factor loadings of less than 0.30 were not used. **Variables that loaded in more than one factor were discarded*

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