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Quantitative Analysis of the determinants of Agro-based Manufacturing Firms' Decision to Export in Nigeria

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ABSTRACT

The study analyzed the determining factors of agro-based manufacturing firms to export agricultural products from Nigeria. Using the cross-sectional data from agro-based exporting firms as obtained from the database of the Nigerian Export Promotion Council (2022 – 2023), 127 viable agro-based firms were selected using the Probability Proportional to Size (PPS) technique. Tobit regression was then employed to examine the determinants of agro-based export decision. The results of the analysis showed that the explanatory variables were consistent with a priori expectations and a statistically significant log-likelihood ratio (p<0.001). Further, export sales (β = 6.00e-9, p<0.001), years of education of the firm's manager (β = 0.027, p<0.002), management characteristics (β = 0.025, p<0.000), export marketing characteristics (β = 0.071, p<0.062), and foreign market characteristics (β = 0.021, p<0.000) were prime determinants that statistically and positively enhance agro-based manufacturing firms' decision to export. Conversely, the decision to export agro-based products was negatively impacted by export destination (β = -0.012, p<0.000), firm size (β = -0.108, p<0.000), firm characteristics (β = -0.115, p<0.006), and domestic market characteristics (β = -0.047, p<0.000). The findings call for the attention of key players in the export sector to leverage the factors that promote exports and at the same time, strengthening the determinants that do not enhance export decision to maximize the export potentials that the Nigeria's agricultural sector is endowed with. This calls for the regulatory authorities such as National Agricultural Quarantine Services and NEPC to work out modalities to raise the quality of agro-based products to international standards.

Keywords: *Export potential, determinants, agro-based products, decision, firms*

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INTRODUCTION

The Nigeria's agriculture sector, which used to be the mainstay of the Nigerian economy still has the potential to change the country's narrative as an import dependent economy to one that is export oriented. In spite of efforts by successive administrations in Nigeria to diversify the economy away from hydrocarbon resources, these efforts leave much to be desired as the agricultural sector is still beset with myriad of challenges hindering the sector's ability to take Nigeria out of economic doldrums.

Several challenges are responsible for the low-level exports of agricultural goods relative to total exports. PWC (2019) identified some of these constraints to include logistic challenges at the ports, inadequate storage facilities, poor distribution network, poor quality of agricultural products for exports and low-value addition to agricultural products. The Nigeria Export Promotion Council (NEPC) revealed that Nigeria has been unable to convert its enormous comparative advantage in the production of several agricultural primary produce to competitive advantage in the global market as a result of supply chain constraints such as poor packaging, labelling, poor storage facilities and preservatives, poor logistics and documentation (Ekugbe, 2021). The export performance of the Nigeria agri – sector shows that the sector has continued to record a negative trade balance. Reports by Adullahi *et al. (*2021) shows that between 1995 – 1999, 2000 – 2004, 2005 – 2009, 2010 – 2014 and 2014 – 2019, the trade balances of Nigeria agri-food trade in million United States Dollars (USD) were $983.6 – 1298,0, $3612.5 – 7158.5 and $3878.5, respectively. The report further revealed that the average trade balance has persisted in spite of several interventions to boost the export performance of agro–commodity enterprises in the country. However, Orjiude and Olatunyi (2021) reported that Nigeria's imports of agricultural goods between January 2017 and March 2021 surpassed its export in the period by ₦3.9 trillion. According to the report, the total value of trade in agricultural goods in the period under review was ₦6.2 trillion, comprising ₦5.04 trillion imports and ₦1.14 trillion exports, with a deficit of ₦3.9 trillion.

Export is critical in the development of any economy. The trend toward globalisation of trade underscores the importance of export as a veritable option to internationalise the trading of goods and services. In developed countries, about 98% of agricultural production undergoes industrial processing, with value added of about US$180 per one tonne of agricultural products (Adom and Simatele, 2022). However, this is not the case for developing countries where barely 30% of agricultural production is processed, generating less than US$50 of total added value per tonne (Adom and Simatele, 2022, Kingsley, 2016). Exports generally and agro-based product export, in particular, have become increasingly significant in developing economies including Nigeria, especially with the presence of knowledgeable private sector. Export of agro-based products has the potentials to accelerate intra-industry trade, integrate the domestic economy into the world economy and insulate the domestic economy from external shocks (FAO and AUC, 2021). Exporting, for agro-based manufacturing firms is not just a technique to maximize profits, but also represents the future of the agro-processing business, improve the competitive advantage of firms. By going global, agro-based manufacturing firms are provided with new global perspectives and can enhance improvements in agro-processing of existing and new agro-based products. Exporting can, also, help a firm to compete more effectively with foreign competitors. Firm export performance reflects a firm-specific behaviour in leveraging its resources and capabilities in an international context at a given point in time. Export performance is the outcome of the combination of various elements framing the production environment and the export products' access to international markets. Firm export performance in itself is regarded as one of the key indicators of the success of a firm's export operations (Beleska-Spasova, 2014). However, several indicators of export performance such as firm size, age of the firm, international experience, export commitment, managerial perception, export marketing mix strategies and product characteristics (internal indicators) as well as political or legal environment, cultural sensitivity, export market competition and export promotion programmes (external indicators) drive the effectiveness and efficiency of products exporting (Sraha, 2016).

The existence of controllable factors means that export performance is under management control, so, the management is considered to be accountable for both excellent and poor export performance. Management characteristics according to Nazar and Saleem (2009) include attitudinal characteristics, skilled based characteristics and behavioral characteristics. An attitudinal characteristic such as management's export commitment enables the management to align with successful export marketing strategies that are capable of enhancing export performance. Also, management perception toward competitiveness, export barriers and management international orientation increase the firm's export intensity (export proportion of sales). Management perception of export barriers such as risk expected, the cost involved and export intricacy (Woldemichael *et al.,* 2017); and global vision and orientation are critical forecasters of excellent export performance, most likely, an international agro-based firm can view opportunities and not be distracted by threats (Escandon-Barbosa *et al.,* 2019). Also, skilled based characteristics like language proficiency, education level, and international experience can enhance export propensity (the firm's choice of whether or not to export) and intensity (the proportion of firms' sales that are exported) (Han and Park, 2019).

The manner of management involvement in planning export sales and presentation, adaptive selling and sales

support is considered to be responsible for the level of export effectiveness (Galanakis, 2016, Nazar and Saleem, 2009). A foreign language can also facilitate contacts with a foreigner and can build trust, which can enable the management to have a better knowledge of the business practices and foreign nations and strengthens the ability of the management to enter into negotiation with foreigners successfully. Thus, firms with foreign language skills have higher chances of gaining overseas business opportunities, and higher export performance than firms that have no such skill (OECD, 2018, Gilaninia *et al.,* 2013).

On the other hand, firm characteristic factors such as firm size and age are relevant predictors of exporting. Firm size is considered to be a useful and manageable estimation of firm resources, which are held to influence export behaviour. Larger firms are in a better position to expand resources and bear risk than smaller firms and could have more bargaining power. Larger firms have control of specialized managerial resources and can take advantage of economies of scale. Also, international experience or foreign contacts and networking can create personal contacts to expand abroad, since managers who travel to different parts of the world are likely to be more successful exporters. Besides, they are most familiar with foreign cultures, thus, clairvoyance to the distance separating them from other countries, putting them on the advantage to engage in exporting. Not just engaging in foreign trade, but would also likely to perform better since they have broader market knowledge than those without such experience (Reis and Forte, 2014, and Nazar and Saleem, 2009).

Over the years, synthesis of the framework and action plans have been designed by the government to achieve overall agro-based industry growth and development. These include the establishment of projects specialising in agro-based processing such as the sugar factories at Numan, Lafiagi, and Sunti, the Calabar Export Processing Zone, and Nigerian Export-Import Bank (NEXIM). In 1973, the Nigerian Agricultural and Co-operative Bank were established to provide credit facilities to support agriculture and agro-based businesses. Also, there was a reformation of the Agricultural Credit Guarantee Scheme (ACGS) credit policies to ease the access to credit by business (CBN, 2021). The bank has funded agro-processing export firms, to the tune of N6.6 billion between the periods from 2009 – 2013 (Gabriel, 2015). Nigeria is yet to develop the capacity to process agricultural raw materials for the local industry and exports to increase the contribution of the agricultural sector to GDP. Also, the huge potentials that the African Continental Free Trade Area (AfCFTA) agreement has offered are yet to be tapped. Analysts posit that the arrangement offers a huge opportunity for Nigeria's bourgeoning economy, *vis-à-vis* providing increased accessibility to a large market for the country agricultural and other exportable goods (Abrego *et al.,* 2020). The AfCFTA, being a common market arrangement, will encourage unhindered flow of Nigeria's agricultural goods to key markets in Africa and beyond. Therefore, this study broadly seeks to examine the determinants that influence agro-based manufacturing firms' decision to export or not as they relate to export performance in Nigeria.

METHODOLOGY

The study area is Nigeria. Nigeria is a sovereign country in West Africa, officially known as the Federal Republic of Nigeria, with thirty-six states and the Federal Capital Territory, Abuja. Nigeria got her independence on October 1st, 1960, and is made up of more than 450 ethnic groups with Hausa, Igbo, and Yoruba being the major tribes. Nigeria is divided roughly in half between Christians and Muslims, while a minority of the population practices religions indigenous to Nigeria. The official language is English. Most often, Nigeria is referred to as the "Giant of Africa" because of its large population and economy. With about 223.8 million people (United Nations Population Fund, UNFPA, 2023), Nigeria is the most populous nation in Africa and the seventh most populous country in the World. Agriculture is the second largest foreign exchange earner in Nigeria after oil. It employs approximately 70% of the population. The small farms produce approximately 80% of the total food in Nigeria. Export of agricultural products (including manufactured food and agricultural products) was the main exchange earner 1970s but dwindled after the discovery of crude in Nigeria. The most important food crops are yams and manioc (cassava) in the Southern part and sorghum (Guinea corn) and millet in the Northern part. Whereas, cocoa and rubber are the principal non-oil foreign exchange earners in Nigeria.

Sampling Technique and Data Collection

The population of this study comprised all registered agro-based exporting firms in Nigeria. It includes among others, firms exporting agro-processed food, beverage and tobacco, wood and wood products, textile apparel and footwear, plastic and rubber products, and pulp paper and paper products. The total number of registered agro-based exporting firms (as at the time of writing this section), according to the Nigerian Export Promotion Council (NEPC), was 325. However, 186 agro-based exporting firms were accessible during the course of this study. A sample of 127 agro-based firms, out of the functional 186 firms, was selected using the probability proportion to size (PPS) sampling method (Nyariki, 2009). A 95% confidence level at an error margin of less than 10% is considered a representative sample for this study as it is typical of agricultural socio-economic research (Nyariki, 2009). This sample size was determined by using the Taro Yamane method for sample size selection from a given population, formulated by the statistician, Taro Yamane in 1967. Data on the export of agro-based commodities were elicited from respondents using Google form.

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

Analytical Techniques

Tobit regression model was used to examine the determinants of agro-based manufacturing firms' decision to export or not. The Tobit model is used because the dependent variable is constrained (or censored) – takes on a positive value for some observations and zero for other observations. The Tobit model allows regression of a variable while censoring it so that regression of a continuous dependent variable can occur. It allows the researcher to specify a lower (or upper) threshold to censor the regression while maintaining the linear assumptions required for linear regression (Madheswaran, 2019).

Explicitly, the Tobit model is stated as;

$$Export\ Decision\ (1,0) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \cdots \ldots . \beta_{11} X_{11} + \varepsilon_i$$

Where,

Y_i = the propensity to export (1 = willingness to export, 0 = otherwise)
β_0 = constant term
$\beta_1 - \beta_{12}$ = parameters to be estimated
X_1 = Destination of export (region/country's name)
X_2 = Export sales (Volume of sales in Naira equivalence)
X_3 = Firm size (No. of employees/sales employees' ratio)
X_4 = Years of education of the firm's manager(s) (No. of years of formal education spent by the firm's manager)
X_5 = Firm's international/ foreign experience (No. of years foreign or international experience of the firm in export business)
X_6 = Firm's age (Business experience the firm has acquired over a given period of time)
X_7 = Management characteristics Firm characteristics (Four-point Likert rating of attitudinal, skilled-based and behavioural characteristics)
X_8 = Firm characteristics (Four-point Likert rating of firm characteristics such as ownership, foreign networking, international experience etc)
X_9 = Export marketing strategy (Four-point Likert rating of marketing mix, product, distribution and promotion capabilities
X_{10} = Foreign market characteristics (Four-point Likert rating of cultural similarities, government regulations and market competitiveness)
X_{11} = Domestic market characteristics (Four-point Likert rating of export assistance and environmental hostility)
ε_i = error term.

RESULTS AND DISCUSSION

Result of the determinants of agro-based manufacturing firms in Nigeria to export agricultural products is presented in Table 1. Using the Tobit regression, it is observed that a substantial part of the observation on the regressand take a limit value, which is zero in the case of volume of export by agricultural firms. The summary statistics of the regression model showed however, a low Pseudo R^2 values of 0.1910 (19.10%). This notwithstanding, the binary dependent models such as Tobit regression are not usually chosen based on the magnitude of R^2 value Gujarati (2009). Interestingly, all explanatory variables, except experience and age of firm, were statistically significant at varying levels of probabilities and were consistent with the *a priori* expectations. The highly significant log-likelihood ratio (LR) is a confirmation that the variables of interest are statistically significant ($p<0.005$). The coefficient of destination of export was negative (-0.0123) but statistically significant at 1% level, implying that export destination (for instance, increase in the distance) had negative impact on firms' decision to export. The negative correlation of export destination and decision to export is not surprising because, most of the agricultural products in Nigeria are exported unprocessed or at most, in semi-processed form. The implication however, is that such products find it difficult to survive the long-distance shipments without getting spoiled. For instance, the rejection of yams from Nigeria by the EU and US markets because of poor quality was largely blamed on lack of refrigerated containers and the long time the produced stayed before its arrival to Europe or America. The EU and US border rejection provided useful insights in the patterns and trends in border rejections where the real compliance challenges lie for developing countries. As noted by PWC (2019), the poor quality of agricultural products from Nigeria is due to poor handling of agricultural products (pre- and post-harvest period), diseases and pests attacks on crops and excessive use of pesticides for preservation purpose. The probable connotation of this inverse relationship could be attributed to the inability of agro-based manufacturing firms to handle large export without compromising the quality and standard. This view aligns with the submission of Gabriel (2015) that Nigeria is yet to develop the capacity to process agricultural raw materials for the local industry and exports that will increase the contribution of the agricultural sector to GDP significantly. The impact of export sales on firm's decision to export was positive and significant at 1% level. This shows that increase in export sales (monetary values of all transactions between exporters and foreign buyers) will increase consistently and significantly the firm's decision to export its commodities. Consistent with *a priori* expectation, export sales represent one of the reasons influencing firms' choice of exporting their goods and/or services. This finding is in harmony with the assertion of Iheanacho *et al.,* (2020) that most of Nigeria's

firms' decision to export to foreign markets is influenced by increase in sales objective. Conversely, firm size on the other hand showed inverse relationship with firms' decision to export to foreign markets. Numerically, the coefficient of firm size was negative (β = -0.108) and was significant at 1% level. This implies that increase in firm size is not necessarily a pre-condition for export, but dependent on other factors such as firms' capacity to produce, the willingness and decision of the firms to export. Contrary to the findings of Niringiye and Tuyiragize (2010) where firm size exerted positive effect on firms' propensity and decision to export, the result herein shows otherwise. Further, Cavusgil (2014) in his submission asserted that there is a correlation between firm size and desire to export. However, as the firm attains certain size, such correlation seizes to hold especially for small firms (as the case of small-size firms in Nigeria). By implication, agro-based manufacturing firms with nationwide operations would be more willing to export than firms with limited local operations. This juxtaposition explains the negative correlation of localised agro-based manufacturing firms in Nigeria to drive the export decision. The education level of the firms' mangers was used a proxy for human capital. Thus, the coefficient of the years of formal education exerted positive (β = 0.0269) and significantly (p<0.000) impact on firms' decision to export to foreign markets whereas, experience is not. Critical evaluation shows that an increase in the level of manager's education will increase consistently and significantly, the firms' decision to export, *ceteris paribus*. Conventionally, education is key to any organistion and improving staff capacity and skill is needed to enhance export performance. This line of thought aligns with the findings of Bekteshi (2019) and Chugan and Singh (2015) that enrichment of firms' capacity through education and skills-specific training impacts positively on export performance. Thus, it can be inferred that firms' whose managers or marketing staff are educated, knowledgeable about international market and marketing and have substantial level of language proficiency can make informed decision to export when compared to their counterparts. Ordinarily, the experience of the firm manager should enhance the firm's marketing choices. The non-significant value of experience in this study could be reasoned that firms' managers have limited experience in export market and hence, limited decision to export.

Management characteristics determinants (attitude, behavioural and skilled-based characteristics) are considered to be accountable for both excellent and poor export performance (Nazar and Saleem, 2009). As expressed in (Table 1), the coefficient of management characteristics determinants was positive (β = 0.0246) and significant (p<0.000). This means that increase in management characteristics such as positive perceptions about export barriers and perceived export advantages or export commitment will increase exponentially, the firms' decision to export. Also, behavioural and skilled-based characteristics like language proficiency, education level, and international experience as indices of behavioural characteristics, as well as the manner of management involvement in planning export sales and presentation have the tendency of increasing the firms' decision to export. In the same fashion, understanding of foreign language by the manager can also facilitate contacts with a foreigner and build trust, which can enable the management to have a better knowledge of the business practices and foreign nations and strengthens the ability of the management to enter into negotiation with foreigners successfully. This result is consistent with findings of Nazar and Saleem (2009) that management characteristics is considered to be responsible for the level of export decision and effectiveness.

The survey also indicated that the firm characteristics' determinants (including firm size, firm ownership, technology level, foreign contact among others) has negative (β = -0.1148, p<0.006) influence, on the firm's decision to export. Contrary to *a priori* expectation which increase in firm characteristics such as increase in number of employees, sales volume, sales employees' ratio, foreign ownership and domestic ownership, labour and supplier market, costumer market and capital market (foreign networking), firms' export market knowledge, number of years in business, number of years in exporting, information centers and level of investment, are expected to increase firms' decision to export, result in this study negates the expectation. Probable reasons for this negation could be attributed to the fact that most of the agro-based manufacturing firms investigated were small-scaled, domestic and localised with little or no foreign connection, and largely lacking in export knowledge. For instance, firms with foreign language skills usually have higher chances of gaining overseas business opportunities, and higher export performance than firms that have no such skill. Also, the lack of compliance of Nigeria's firms to standard is seen as the major reasons for missed trade opportunities when exporting their products. As noted by Hanson and Olale (2011), while EU rejections have been dominated by products that contravene restrictions on levels of mycotoxins, in the US non-compliance with labelling and company/process registration requirements has been the prevalent cause of rejections as typified by the recent experience of Nigeria's export (yams and cowpea) at the international market.

The coefficient of the export marketing strategy determinants is positive (β = 0.0714) and statistically significant (p<0.000). By implication, it means that export marketing strategy determinants increases, consistently and significantly, firms' export decision by 7.14%. Considering the intricate attributes of export market characteristics such as marketing mix (product promotion, pricing adaptation), pricing capabilities (firms' capability to adapt to prices), promotion capability (firm's capability to use advertising, sales promotion, personal selling, promotion adaptation and export promotion programmes in export market), product capabilities (product strengths - product uniqueness, patents, exposure to the market,

Table 1: Determinants of Agro-based Manufacturing Firms to Export Agricultural Products.

Dependent variable	Coefficient	Std. Error	Z	P > | Z |
Destination of export	-0.0123	0.0035	-3.49	0.000***
Export Sales	6.00e-9	3.85e-10	15.58	0.001***
Firm Size	-0.108	0.0087	12.34	0.000***
Years of education of the firm's manager	0.0269	0.0085	3.16	0.002***
Firm's international experience	0.0083	0.0054	1.55	0.124
Age of Firm	0.0025	0.0045	0.55	0.585
Management Characteristics (MCH)	0.0246	0.0034	7.25	0.000***
Firm Characteristics (FCH)	-0.1148	0.0407	-2.82	0.006***
Export Marketing Strategy (EMS)	0.0714	0.0378	1.89	0.062*
Foreign Market Characteristics (FMCH)	0.0208	0.0037	5.65	0.000***
Domestic Market Characteristics DMCH)	-0.0470	0.0036	-13.16	0.000***
_ Constant	0.1349	0.0363	3.71	0.000***
Number of observations	127			
LR $chi^2(11)$	32.54			
Prob > chi^2	0.0006			
Pseudo R^2	0.1910			

***and * indicate statistical significance at 1 and 5% level, respectively.
Source: Field Survey, 2023

distribution, after-sales service, warranty and customer services - warranty and provisions for pre- and after-sales services, and product adaptation), it is expected that appropriate application of these attributes would translate directly to the enhancement of agro-based manufacturing firms' export decision. In the same vein, the coefficient of foreign market characteristics determinants is positive (β = 0.02085) and statistically significant (p<0.000). This implies that increase in foreign market characteristics (cultural similarity, legal and political, economic similarity, channel accessibility and factors such as political and legal environment) increases the decision-making process of agro-based manufacturing firms to export to foreign markets by 2.08%.

The coefficient of domestic market characteristics as a determinant of export decision and performance is negative (β = -0.0470) and statistically significant (p<0.000). This means that domestic market characteristics such as institutions, national export policy and currency tend to decrease consistently and significantly, the decision of firm to export. As noted earlier, export market in Nigeria is characterized by weak institutional base (financial and infrastructural institutions) to coordinate policies and programmes responsible for the export of agricultural products (Umana, 2018). Similarly, the weak and constantly devalued national currency (Naira) against the dollar and other foreign currencies make it possible for the domestic market characteristics to exert any positive influence on export market, especially with regard to the firm's decision to export. Also, exchange rate in Nigeria largely plays a big role in export market and decision of firms to export. Currency value can be an advantage for domestic manufacturer, and could also be a problem to exporters (Nnabuife, 2019). For instance, Nigeria naira has fallen so drastically in the recent years, and this has affected international companies that import product or part of their material outside the country. This factor is the reason for withdrawal of so many multinational companies in Nigeria due to fallen exchange rate of naira to US dollars. Since international trade operation is aimed at enabling a country to exchange its locally produced goods (the ones it has more comparative advantage) to other countries, a friendly exchange rate is a motivation for domestic producer to produce locally made goods for export. This view is supported by Nnabuife (2019) that exchange rate has been a factor that hinders the growth of international trade operation in Nigeria, as the rate for naira to dollars always depreciates in value each time, this has caused a lot of damage and it is said to be politically motivated.

Conclusion and recommendations

Nigeria's drives to increase non-oil exports, especially through agriculture remains a top priority in the diversification agenda of the federal government. As noble as the objectives are, export of agro-based products is beset with myriad of challenges. Attempts to examine these challenges, it is concluded that the volume of sales, educational qualification of the managers of agro-based firms, years of experience in international trade, managerial skills (management characteristics), export strategies such as promotion and advertorials and foreign market characteristics, including competition are key factors that will consistently enhance the export potential of agro-based products in Nigeria. Thus, leverage on these determinants could reposition the agricultural sector as the main foreign income earner in Nigeria. Conversely, export destination, firm size as evident in the small number of employees, firm characteristics (lack of business experience) and the hostile domestic business environment (domestic characteristics) were found to inhibit significantly the export drive of the country.

Based on the findings of the study, the following were recommended:

i. To harness the huge potentials that Nigeria has in the agricultural export market, measures such as implementation of international food safety procedures, should be put in place to significantly increase the production of agricultural goods that will enhance the competitiveness of Nigeria's commodities (quality, standard units, taste etc) in the export market.

ii. The regulatory authorities in Nigeria (National Agricultural Quarantine Services, NAFDAC, Nigeria Export Promotion Council, Standard Organisation of Nigeria, National Export Processing Zones Authority) that are saddled with the mandates of standard development, regulation, monitoring, control and financing across the agriculture value chain should intensify efforts in the discharge of their responsibilities to ensure that Nigeria regain her place in the export market as it were in the early 70s.

iii. Agricultural exports from Nigeria are also done in their unprocessed form. Thus, the lack of value-addition to agricultural goods that are exported has accounted for the significant loss in foreign earnings accruable to the Nigeria. Therefore, improvement in value addition will increase the foreign earnings and reduce the perishability and deterioration of agricultural products from Nigeria in the international markets.

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