Competitiveness of Nigerian Exports of Cocoa Products in The Global Market

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ABSTRACT
Cocoa is a significant contributor to the economic growth in Nigeria. Over the past three decades, cocoa alone contributes annual average of US$313million to the Gross Domestic Product (GDP) of the country. However, the growth potentials of Nigerian exports of cocoa products are yet to be fully exploited for industrial and agribusiness development nationally and internationally on a competitive basis. It has therefore become necessary for the country to diversify the sources of its foreign exchange earnings through increased export competitiveness of cocoa based products in the global market. Therefore the paper examined competitiveness of Nigerian exports of cocoa products and evaluates determinants of the competitiveness in the global market. Secondary time series data covering 37 years from 1980 to 2017 were used. Data were analyzed using augmented Dickey Fuller Statistics, autoregressive distributed lag model and error correction mechanism. Significant determinants of competitiveness of exports of cocoa products suggest a compelling need for directing resources into increased production of cocoa beans and diversify the primary product into domestic industries for generation of more value-added products of cocoa in order to generate increased non-oil foreign exchange earnings for the country. Investment on research and development and infrastructural deficit especially rural roads network should be given priority attention. This will reduce logistic costs and effectively connect various actors in cocoa value chain to global markets and thus enhance competitiveness of cocoa products in the global market.
Keywords: Competitiveness, Export, Market, Infrastructure, Research, Development

1. INTRODUCTION
Globally, cocoa is produced by most developing countries across Asia, Africa, and Latin America, all of which are tropical or semi-tropical areas (Oluyole, 2017). Nigeria is the World's fourth largest cocoa producer after Ivory Coast, Ghana, and Indonesia, producing an average of 296.72 thousand tonnes over the period 1980 and 2017. This represents about 9 per cent of the World's average production over the same period (FAO Database accessed, 2019). Cocoa contributes significantly to the economic growth of Nigeria, adding an average of US$313.33 million to the annual Gross Domestic Product of the country. The product recorded an average annual growth rate of 2per cent in its contribution to the Gross Domestic Product of Nigeria between 1980 and 2017. In terms of foreign exchange earnings, the value of the Nigerian exports of cocoa increased from 243.39million dollars in 1980 to 598.19 million dollars in 2017(FAO Database accessed, 2019). Cocoa is thus a strategic agricultural export commodity with high investment and export potentials for generating a diversified foreign exchange revenue from varied manufactured and semi-manufactured products of the commodity such as cocoa butter, cocoa cake, cocoa powder, chocolates and cosmetic products. Stable market exists globally for cocoa and cocoa products apart from being important raw material for local industries. The countries to which exporters mostly direct cocoa are Great Britain, France, Uruguay, Germany and Holland (Adewuyi et al, 2014).
However, the growth and export potentials of cocoa and cocoa products are yet to be fully exploited nationally, for industrial development and for generation of increased foreign exchange earnings. This has

been complicated by restricted access to global markets which is aggravated by obstacles like infrastructure deficit in Nigeria. Infrastructure deficit restrains processing capacity of emerging domestic industries for increased value addition. Further, the infrastructure deficit in the country also impedes effective linkage of cocoa based processing firms to the global markets thus obscuring the export competitiveness of cocoa based products and other important agricultural exportable products of the country.

Further, in the past few years, about 84,000 of the population have lost their jobs in the cocoa value chain industry while over 16 cocoa-based processing companies have folded up in the last ten years compounding the menace of high rate of unemployment in Nigeria (FAO in Guardian of October 8, 2018, page 40-41). The folding up of over 16 cocoa processing industries has resulted into huge loss of foreign exchange earnings. The Food and Agricultural organization (FAO) of the United Nations (UN) indicated that Nigeria has lost over N100billion since 2008 due to inability of the country to produce and diversify the raw agricultural produce into domestic agro-based industries as well as inability to process and export more products. According to FAO, if the cocoa value chain is revitalized through improved competitiveness Nigeria could earn additional one trillion naira annually. Exploiting the huge income and employment generating potential is quite feasible since the county has a suitable climate for increased production of cocoa and other important agricultural export commodities. Improved agricultural competitiveness will have positive impact on the welfare of a large portion of smallholder farmers and other economic agents who are engaged in cocoa value chain by creating income and employment opportunities for the significant portion of the population in the rural areas. Improved competitiveness of exports of cocoa and cocoa products in the global market will impact substantially on export growth and export growth would in turn generate cash income for modernizing agricultural practices which ultimately could create more jobs in agricultural processing and marketing as well as expanding cocoa based agro-processing industries and other non-farm activities in the rural Nigeria. Thus, a sustainable increase in the production and exports of cocoa and cocoa products will depend on the competitiveness of cocoa based products in the global markets and the effects of significant factors driving the competitiveness in the word markets. More importantly, in the diversification efforts of the government of Nigeria, it is now crucial for the country to reposition the importance of agricultural exportable products such as cocoa in the global trade and its contribution to the economic growth as a renewable and sustainable source of foreign exchange earnings in the non-oil sector in Nigeria.

In the recent time, efforts of government of Nigeria at improving export earnings include implementation of project made in Nigeria for export (MINE). This was aimed at unlocking the potential of special economic zones (SEZs) based on comparative advantage of each free trade zone that were set up across the country. The project intends to improve manufacturing's share of GDP which remained at average of 9 per cent over the period 2013 to 2017, create jobs and increase export earnings. Many other efforts include strengthening of Bank of Industry (BOI) to provide easy access loans to Medium and Small Scale Enterprises (MSMEs) at single digit to the tune of N10million, rehabilitation of major roads to improve transportation of agricultural products and provision of access power in key economic clusters and markets around Nigeria. The objective of the paper therefore, is to evaluate the competitiveness of cocoa based products in the global market using revealed competitive advantage indicator and to assess the major determinants of the competitiveness of the products in the global market. This is quite imperative in order to provide the information that would be required to propose policy strategies to improve the competitiveness of cocoa based products in the global market toward generation of increased foreign exchange earnings and increased employment in the cocoa value chain for Nigeria. The paper is organised into four sections. Following this introductory section is section two which focuses on the research design and methodology adopted. Section three presents and discusses the major results while the paper is rounded off in section four with policy recommendations and conclusion.

2. METHODOLOGY
2.1 Types, measurement and sources of data.
Secondary data which are time series were obtained from joint databases of the Central Bank of Nigeria(CBN) and National Bureau of Statistics (NBS), International Food Policy Research Institute(IFPRI) and Agricultural Science and Technology Indicators (ASTI), United Nations Conference on Trade and Development (UNCTAD) and World Development Indicators (World Bank). The specific data extracted included Nigeria's export value of each of cocoa beans, cocoa butter, cocoa powder and cake, Nigeria's export of goods and services, Nigerian import value of each of the cocoa based products. World's agricultural exports, World's export of goods and services, Nigeria's agricultural import value, Nigeria's imports of goods and services, world's agricultural import, and the world's import of goods and services, all measured in United States Dollar Equivalent (US$). Also, the data included gross fixed capital formation in agriculture in Nigeria in US$, Agricultural Researchers with MSc/Ph.D as a percentage share of total, total number of agricultural researchers per hundred thousand farmers in full time equivalents, total agricultural research expenditure in US$, and official exchange rate in naira per US$. Others data extracted included foreign direct investment in agriculture in US$, government total spending on road construction and maintenance in real terms in US$, government total spending on transport and communication in US$, electricity power consumption from public provision in kilowatt hour per capita, tariff rate in percentage, lending interest rate in percentage, and world market price of each cocoa beans and cocoa products in dollar per tonne. The dataset spanned 1980 and 2017, which is 37 years. This time coverage of the data satisfied the econometric properties of a large sample size required for the estimate of the determinants of competitiveness using Co-integration and Autoregressive Distributed Lag (ARDL) regression Technique.

2.2 Analytical methods.
Descriptive and inferential analyses (averages and coefficient of variation) were used to analyse the dataset to elucidate the variables. The estimation is followed by computation of the Revealed Competitive advantage of each of cocoa beans, cocoa butter, cocoa powder and cake. Time series analysis of the data was carried out using Augmented Dickey Fuller (ADF) statistics. Finally, cointegration, and error correction model was estimated using Autoregressive Distributed Lag (ARDL) technique to analyse the determinants of competitiveness of each of the agricultural export product.
Revealed Competitive Advantage (RCA) Index is calculated for each of the export product using the model in equations 2.1, 2.2 and 2.3 which was adapted from (Vollrath, T.L. 1987, 1991).

$RCAi,ag = RCS_{i,}ag – RCDi,ag.$ ……………………………………………………….2.1

Where $RCS_{i,}ag = [(X_{i,}ag/ X_{i,}gs)/ (Xw_{,}ag/Xw,gs)]$ …………………………………….2.2

$RCD_{i,}ag = [(Mi, ag /M_{i,}gs)/ (Mw, ag/Mw,gs)]$…………………………………………2.3

$RCS_{i,}$ ag refers to Nigeria's Revealed Comparative Supply of agricultural export, with

$X_{i,}$ag refers to the country i's export value, $X_{i,}$gs refers to the country's export of goods and services, Xw, ag refers to the world agricultural export value and Xw,gs refers to the world export of goods and services.

RCD_{i} ag refers to revealed comparative demand for agricultural product with Mi,ag refers to the country's agricultural import value, $M_{i,}$gs relating to the country's import of goods and services. Mw,ag refers to the world's agricultural import, and Mw,gs refers to the world's agricultural import.
The difference between RCS_{i} ag and $RCD_{i,}$ag measures net relative trade shares and is called revealed competitive advantage (RCAi,ag)[Vollrath,T.L. 1987, 1991].
Theoretically, quantitative indicator of revealed competitive advantage (RCA) contains two comparisons. Firstly, is between two trading entities, Nigeria and the World, and secondly, is between two commodities, agricultural export commodity and all goods and services. RCA coefficients are largely

determined by economic factors such as resource endowments, technology and income (Vollrath, T.L.1987, 1991).The indicator, RCA, summarize how a country or region has performed in commodity trade, thus it is a better indicator of competitiveness than of the comparative advantage. Nigerian Agricultural export is expected to be influenced by investments in Research and Development and human capital that induce changes in agricultural production resulting in efficient utilization of other inputs. Export competitiveness requires large investment in research and development, advanced technology, high quality infrastructure and close interactions between firms and research institutes (Zhang, 2015). From this point of view, in this paper, a set of variables including physical capital, research and development, mobile phone subscriptions as a proxy for telecommunication aspect of infrastructure and foreign direct investment (FDI) inflows are variables that are theoretically expected to influence the competitive advantage of agricultural exports of Nigeria in the global market. As a stock of physical capital increases, a country experiences capital deepening which provides for a more productive labor force and thus enhances product upgrading.

Capacity and technology of industry depend on the availability and quality of infrastructure, ranging from roads and ports to telecommunication. Poor transport and communications infrastructure isolate countries, limiting their participation in global economy (Gonul M and Yusuf M, 2016). Similarly, domestic technological effort is an important determinant of both quality (exports upgrading) and quantity (exports capacity) which highlights the importance of domestic Research and Development (R&D). R&D efforts lead to successful innovations; new products drive and the acquisition of export market shares. Strong R&D efforts enhance competitive advantage. Use of R&D expenditures as its share of GDP is expected to affect revealed competitive advantage of agricultural exports in a positive way.

Conceptually, FDI has a more complex relationship with trade and export competitiveness. In general terms, FDI has been blamed for reducing employment in home countries while it is said to increase employment, generate transfers of technologies, and encourage growth and exports in host countries. FDI can be either trade creating or trade replacing. Trade creation occurs when FDI opens access to a new market and facilitates exports from Nigeria. On the other hand, trade diversion occurs when trade and FDI are substitute. Further, it is expected that FDI may lower or replace domestic savings and investment for indigenous exporting firms; transfer technologies that are low level or inappropriate for the host country's factor proportions; target primarily the host country's domestic market and thus not increase exports; inhibit the expansion of indigenous firms that might become exporters; and not help develop the host country's dynamic competitive advantages by focusing solely on local cheap labor and raw materials (Zhang, 2015).

So in analyzing the determinants of competiveness of Nigerian cocoa beans and cocoa based exports in the global market the following model is used to achieve this objective. The model is adapted from Zhang 2015. This is specified and estimated for Revealed competitive advantage of each of cocoa beans, cocoa butter, cocoa powder and cake. The model is specified as:

$$rca_{it} = \beta_0 + \beta_1 fdi_{it} + \beta_2 gfcf_{it} + \beta_3 lint_{it} + \beta_4 EXHR + \beta_5 rd_{it} + \beta_6 Infra_{it} + \beta_7 Tfr\,e_{it} + \beta_8 WP + \varepsilon_{it}$$

…………………………………………………………………………………. (2.4)

Where rca is revealed competitive advantage indicator for each of the cocoa product, fdi is foreign direct investment, gfcf is gross fixed capital formation, lint is bank's lending interest rate, rd is the variable for research and development. EXHR is exchange rate, Infra is infrastructure variable for road, telecommunication and communication and electricity consumption per capita, Tfr is tariff rate, WP is world market price, β_0 is the constant and ε_{it} is the error term of the model.

3. RESULTS AND DISCUSSIONS

3.1 Revealed Competitive Advantage

This section presents the description of variables considered in the analysis. The results in table 3.1 show that all the indices of revealed competitive advantages for cocoa beans, cocoa butter, cocoa powder and cake are greater than one for the period between 1980 and 2017 with few exceptions. The only exception is the revealed competitive advantage of cocoa powder and cake which was less than one over the period from 1990 to 2009. This implies that Nigeria has a competitive advantage in the export of cocoa beans, and cocoa butter in the global market over the entire period. Similarly, the country has a competitive advantage in the export of cocoa powder and cake in the global market over the sub-period 1980 to 1989 and over the sub period 2010 to 2017. However, the country has a competitive disadvantage in the export of cocoa powder and cake in the global market over the sub-period from 1990 to 2009. The results in table 3.1 further reveals a lower revealed competitive advantages for transformed products of cocoa than primary product of cocoa, suggesting that the target of government effort of increasing foreign exchange generation from export of higher valued transformed products of agricultural exports rather than export of primary raw agricultural products have remained unattainable. One can easily deduce that the objective of increasing foreign exchange earnings from export of higher valued manufactured products of agricultural products by government has not been fully achieved.

Table 3.1: Mean and Variability in Revealed Competitive Advantage of Agricultural Export Products, 1980-2017

Periods and Descriptive Statistics.	Cocoa beans	Cocoa butter	Cocoa powder and Cake
Average 1980-1989	24.43	6.45	4.03
Standard Deviation, 1980-1989	14.59	2.56	2.86
Coefficient of Variation (%) 1980-1989	59.72	39.74	70.95
Average 1990-1999	31.70	2.72	0.99
Standard Deviation 1990-1999	10.80	1.25	0.74
Coefficient of Variation (%) 1990-1999	34.06	45.98	75.17
Average 2000-2009	24.44	3.33	0.86
Standard Deviation 2000-2009	7.78	1.39	0.51
Coefficient of Variation (%) 2000-2009	31.83	41.54	58.62
Average 2010-2017	17.33	4.89	2.16
Standard Deviation 2010-2017	8.04	1.59	0.70
Coefficient of Variation (%) 2010-2017	46.42	32.50	32.41

Source: Author's Estimation

The higher values of the revealed competitive advantage indicator for cocoa beans than those of cocoa butter, cocoa powder and cake in the world market will continue to encourage massive export of primary cocoa into the global market than the export of manufactured cocoa products. Further, the coefficient of variation in the revealed competitive advantage of each of the agricultural export product is very high. This suggests that capacity of the products to generate increased foreign exchange earnings from export of the products by the country is highly unstable.

3.2 Investment in Agricultural Research and Development
In international market, information plays a large and significant role in the process of innovation and improvement which come from simple investment in research and development (Vollrath, T.L. 1991). Investment in research and development will influence the capacity of a firm or a nation to innovate and upgrade which ultimately will enhance the international competitiveness of the firm or the nation. The results in table 3.2 show a declining trend in the total agricultural research expenditure in Nigeria over the period from 1980 to 2017. Growth rate of investment in research declined from an annual average of 14 per cent over 1991-2000 sub-period to annual average of -5per cent over 2011-2017 sub-period suggesting an apparently decreasing priority given to agricultural research and development in Nigeria. Apart from the problem of low funding, the release of funds also saw high instability over the past three and a half decades as shown by high coefficients of variability in the growth rate of expenditure over the period. This is consistent with observation of Ayoola 2018. He observed that budgetary allocation for research and development are generally less than 0.2% of GDP in Nigeria compared to Korea's 2 %. The main purpose of establishing research and development (R&D) institutions is to build up science and technology capabilities that will generate innovations for national development. Research generates technological innovations and extension diffuses the innovations. The innovations could be in process technology, product technology, genetic engineering or new branding and packaging for accessing the global market. The low level of funding of agricultural research institutions in the country have limited the degree of success in export competitiveness unlike the case with developed economies. Low and unstable funding is a key factor that limits commercialization of research findings and breakthroughs in Nigeria.

Arising from the low and unstable funding of research and development, the number of agricultural researchers per one hundred thousand farmers still remain very low, although the number increased from an average annual figure of   about 8 researchers per one hundred thousand farmers during the period 1981-1999 sub-period to average annual figure of about 23 researchers per one hundred thousand farmers over 2011-2017 sub-period. Similarly the proportion of   total agricultural researchers with higher education, that is, those possessing M.Sc. and Ph.D. degrees remained lower than 42 per cent over the entire period under review.

Table 3.2: Mean and Variability in Investment in Agricultural Research and Development 1980-2017.

Periods and Descriptive Statistics.	Agricultural Researchers with MSc and Ph.D. as a share of total	Total agricultural researchers per 100,000 farmers (FTE, Full time equivalents).	Total Agricultural Research expenditures	Growth rate of total agricultural research expenditures
	in %	Averages and standard deviations in absolute number	Value of averages and standard deviation in US$million	in %
Average 1981-1990	22.21	7.99	10548.12	-15.18
Standard Deviation, 1980-1989	5.10	0.38	7372.40	24.41
Coefficient of Variability in (%) 1981-1990	22.97	4.72	69.89	-160.79
Average 1991-2000	34.19	9.18	6703.05	14.51
Standard Deviation 1991-2000	2.16	0.69	36525.69	36.28
Coefficient of Variability in (%) 1991-2000	6.32	7.53	54.49	250.12
Average 2001-2010	39.86	13.88	18403.02	16.27
Standard Deviation 2001-2010	1.21	2.96	7794.53	26.18
Coefficient of Variability in (%) 2001-2010	3.02	21.36	42.35	160.94
Average 2011-2017	41.61	22.51	20854.91	-5.03
Standard Deviation 2011-2017	0.82	1.29	5818.80	21.64
Coefficient of Variability in (%) 2011-2017	1.96	5.75	27.90	-429.91

Source: Author's Computation.

3.3 Gross Capital Formation in Agriculture

Capital formation is prerequisite to an increase in physical capital stock of a nation with investment in social and economic infrastructures. In agriculture, capital formation is investments over time on durable capital items such as machinery and implements and construction of buildings and facilities to induce increased productivity (FAO, 2017). It is being constantly augmented by the process of investment and constantly diminished by the process of depreciation. Agricultural productivity increases with increase in investment in durable capital items. Table 3.3 revealed that gross capital formation in agriculture as a proportion of agricultural gross domestic product is very low.

Table 3.3: Mean and Variability in Gross Fixed Capital Formation in Agriculture in Nigeria, 1980-2017.

Descriptive Statistics.	Gross Capital Formation	Growth rate of Capital formation	Gross Capital Formation as % of Agric. GDP
	Value of averages and standard deviation in US$million	%	
Average 1981-1990	262.74	48.21	0.10
Standard Deviation, 1980-1989	177.91	173.40	0.04
Coefficient of Variability in (%) 1981-1990	67.71	359.64	41.21
Average 1991-2000	651.48	354.45	1.71
Standard Deviation 1991-2000	687.83	1093.07	1.35
Coefficient of Variability in (%) 1991-2000	105.58	308.38	78.59
Average 2001-2010	2010.70	27.50	3.51
Standard Deviation 2001-2010	1047.23	35.22	0.42
Coefficient of Variability in (%) 2001-2010	52.08	128.08	11.85
Average 2011-2017	4211.73	0.69	4.21
Standard Deviation 2011-2016	498.85	12.49	0.08
Coefficient of Variability in (%) 2011-2017	11.84	1810.58	1.98

Source: Author's Computation.

The proportion increased from an annual average of 0.1per cent over the sub-period 1981-1990, to only 4.2 per cent over 2011-2016 sub-period, averaging approximately 2.2 per cent over the entire period under review. Moreover, the instability in the capital formation is very high as shown by coefficient of variability of 106 per cent over the sub-period 1991-2000. Fluctuations in capital formation will have considerable adverse effect on productivity. The proportion of capital formation that can sustain high productivity in agriculture for robust economic growth must not be less than 27percent, and it can go as high as 37per cent of GDP (Sarah et al 2012). One can easily deduce that the proportion of gross capital formation relative to agricultural gross domestic product is far below the benchmark of 27per cent of the agricultural gross domestic product in the country. The current opinion is that capital is perhaps the most limiting of the farm resources. Lack of capital is considered to be the main cause of the prevailing low labour and land productivity in agriculture manifesting itself in a vicious cycle of low levels of income which in turn could lead to low savings and investment resulting in low productivity (Veeman et al 1995, FAO, 2017, Adesimi, 1988). This in turn could lead to low agricultural export performance in Nigeria.

3.4 Investment in Infrastructure in Nigeria, 1980-2017
In recognition of the importance of road transport and communication infrastructure in fostering market connectivity and competitiveness of Nigeria exports, investment by the government of Nigeria on development of the infrastructure increased from an annual average of US$725.95 million over 1981-1990 sub-period to US$2.02billion during the 2011- 2017 sub-period(Table3.4) When the investment is compared with Gross domestic product of Nigeria, the table showed that the investment in road, transport and communication infrastructure accounts for only 1.19 per cent of GDP over 1981-1990 sub-period and this further declined to annual average of 0.44 per cent of GDP during 2011- 2017 sub-period, averaging 0.93per cent over the past three and a half decades. Comparing this to China, for instance, during 1996-2005 period, infrastructure investment was an average of 7.78 per cent of China's GDP and this spurred a large part of China's industrial growth (Claudia, 2017). The level of road and transport infrastructure development in Nigeria is still low. About 30 per cent of the rural population have access to all-weather roads ((Fungo et al, 2017). Insufficiency of good infrastructure in Nigeria inhibits development of manufacturing value chains and impedes diversification. Poor transport infrastructure, and high transport cost are missing links in the transport network in Nigeria. This poses a challenge for market integration and international trade. Trade costs in Nigeria are four to five times larger than in the United States (Atkin and Donaldson, 2015). Again, the same table 3.4 revealed that public electric power consumption per capita is low, although it has been improving over the period under review.
In Nigeria, improvement of industrial activities will depend on the extent to which infrastructure investment is well targeted. Efficiency in spending   should be geared towards improving electricity consumption, transportation system and repair of old damaged roads and build new ones that links village to village and village to industrial centres, urban towns and ports. In this way, the infrastructure investment will facilitates freight, lower transaction costs, increase accessibility, specialization, market expansion and increased competitiveness of agricultural exports.

Table 3.4: Mean and Variability in Infrastructure Investment and Consumption of Electricity

Periods and Descriptive Statistics.	Road Construction and Maintenance	Transport and Communication	Public Electric power Consumption per capita.	Total Investment in Road, Transport and Communication	
	Averages and standard deviations in US$million.	Averages and standard deviation in US$million.	Average and standard deviation value in kilowatt hour per capita.	Average and standard deviation value in US$million	Averages and standard deviations in % of GDP
Average 1981-1990	125.89	600.07	80.85	725.96	1.19
Standard Deviation, 1980-1989	38.53	621.79	14.01	643.20	0.70
Coefficient of Variation (%) 1981-1990	30.61	103.62	17.32	88.60	58.39
Average 1991-2000	220.11	179.66	86.27	399.77	0.58
Standard Deviation 1991-2000	390.83	148.83	8.86	497.63	0.41
Coefficient of Variation (%) 1991-2000	177.56	82.84	10.27	124.48	70.44
Average 2001-2010	1145.35	567.22	117.01	1712.57	1.30
Standard Deviation 2001-2010	961.13	490.96	19.13	1404.86	0.63
Coefficient of Variation (%) 2001-2010	83.92	86.55	16.35	82.03	48.20
Average 2011-2017	1587.78	432.44	147.99	2020.22	0.44
Standard Deviation 2011-2017	740.54	100.19	5.03	793.79	0.21
Coefficient of Variation (%) 2011-2017	46.64	23.17	3.40	39.29	47.38

Source: Author's Computation.

3.5 Determinants of Competitiveness of Cocoa Products
Cocoa Beans

Table 3.5.1 shows the estimated parameters and the related statistical tests of the model estimated for cocoa beans export. As shown in the Table, four variables are statistically significant determinants of competitiveness of cocoa beans in the world market. These are foreign direct investment (FDIA), exchange rate (EXCHR), investment on roads construction and maintenance (INFRAROAD) as well as electricity consumption per capita (ECKWHPC).

Table 3.5.1: Estimated Model for Cocoa beans
Dependent Variable: Revealed Competitive Advantage of Cocoa Beans [D (LOGRCACO)]

Explanatory Variable	Coefficient	t-Statistic	Prob
Constant	0.585391	2.049625	0.0515
D(LOGRCACO(-1))	-0.674965	-4.417705	0.0002
D(LOGFDIA(-1))	0.164200***	2.512127	0.0191
D(LOGTAGRHEDU(-1))	1.662603	1.578041	0.1276
D(LOGEXCHR(-1))	0.195377**	1.979632	0.0593
D(LOGINFRAROAD(-1))	0.064739**	2.485541	0.0203
D(LOGECKWHPC(-1))	0.030079**	2.331075	0.0285
D(LOGYDCO(-1))	0.136468	0.429047	0.6717
D(LOGLINTR(-1))	-0.485032	-0.958417	0.3474
R-squared	0.644527		
Adjusted R-squared	0.511224		
Durbin-Watson stat	1.505643		

means significant at 5percent   * means significant at 1 per cent.
Source: Author's Estimation.

There is positive relationship between foreign direct investment in agriculture (FDIA) and revealed competitive advantage of cocoa beans (RCACO). The estimated coefficient is 0.16 and statistically significant at 1per cent. The magnitude of the coefficient suggests that a 10 per cent increase in foreign direct investment in agriculture will lead to an increase of 1.6 per cent in revealed competitive advantage of cocoa beans export. Foreign direct investment (FDIA) may complement exports when it opens access to a new market and facilitates exports by establishing marketing and distribution channels that in turn facilitates exports of goods. It can induce increased employment and generate transfer of technologies to encourage growth of exports in host countries (Zhang, K.H. 2015, Gonul M and M. Yusuf, 2016).

The sign of the coefficient of exchange rate is positive indicating that the variable exerts a positive effect on revealed competitive advantage of cocoa beans export and the effect is statistically significant at 5per cent. The magnitude of the coefficient, 0.19, suggests that a 10 per cent increase in exchange rate will lead to 1.9 per cent increase in the revealed competitive advantage of cocoa beans export. The estimated coefficient of the variable on investment on road construction and maintenance is 0.06 and statistically significant at 5per cent. The magnitude of the coefficient suggests that a 10 per cent increase in investment on road construction and repairs of old ones will lead to 0.6 per cent increase in the competitiveness of cocoa beans exports. Electricity consumption per capita is positively related to the revealed competitive advantage of cocoa beans. The coefficient is statistically significant at 5per cent. The magnitude of the coefficient, 0.03 suggests that a 10per cent increase in per capita consumption of electricity will lead to 0.3 per cent increase in competitiveness of cocoa beans export. This is plausible because exports of cocoa beans and cocoa based products such as cocoa butter and cocoa powder and cake are complementary exports. Electricity is required for processing of cocoa beans into the complementary export products. A lot of effort has been devoted to promoting production and export of cocoa products. Initiatives are targeting   production for processing as well as targeting small producers to enhance their production. Multinational manufacturers procure processed cocoa in the form of cocoa cake, cocoa powder and cocoa butter from local Nigerian processing factories. There are also multinational manufacturers which buy processed cocoa beans from multinational processors. Multinational processors receive their cocoa beans from multilateral traders and Nigerian merchant exporters. Local processors obtain supply of cocoa beans from cocoa farmers' cooperatives, and local buying agents. Local exporters of cocoa beans and merchant exporters collect cocoa from brokers who work directly with smallholder farmers (Adewuyi et al 2014).

Cocoa Butter

Table 3.5.2 shows six variables are significant determinants of revealed competitive advantage of cocoa butter (RCACB). These are gross capital formation in agriculture (GFCFAGRIC), government expenditure on agricultural research (TAGRED), exchange rate (EXCHR), government expenditure on transport and communication infrastructure (INFRATC), tariff rate (TFR) and world market price of cocoa butter (WPCB). The estimated coefficient of gross capital formation in agriculture is positive and significant at 1 per cent. The magnitude 0.60 implies a 10per cent increase in gross capital formation will lead to 6per cent increase in competitiveness of cocoa butter exports. The estimated coefficient of government investment on agricultural research and development is positive and significant at 5 per cent. The magnitude of the coefficient is 0.10, suggesting that a 10 per cent increase in government spending on research and development will induce 1per cent increase in revealed competitive advantage of cocoa butter exports.. This is possible if the actual spending results in commercialization of research findings and breakthrough which could lead to technology and product improvement.

The coefficient of exchange rate is -0.32, indicating that a 10per cent increase in exchange rate will lead to 3.2 per cent decrease in competitiveness of cocoa butter. This is plausible since depreciating exchange rate will lead to higher cost of production of Nigerian product. This will make Nigerian products less competitive than imports from other producing countries in the world market. Estimated coefficient of government investment in transport and communication is positive and significant at 5 per cent. The magnitude of the coefficient is 0.35, implying that a 10per cent increase in government investment in transport and communication infrastructure will induce 3.5per cent increase in revealed competitive advantage of cocoa butter. If the government spending on transportation and communication translates to increased transportation system, it could reduce transaction and logistics cost of moving products from hinterland to the global market. Effective communication system resulting from investment in communication infrastructure could lead to exchange of new ideas and new innovation among firms. This result is consistent with theoretical expectation. The coefficient of tariff rate is positive and the magnitude is 0.15. This is significant at 1percent. With regard to world market price, the estimated coefficient is negative and significant at 5per cent. The magnitude of the coefficient is -0.32, suggesting that a 10 per cent increase in world market price of cocoa butter will lead to 3.2per cent decrease in the revealed competitive advantage of the product. This is possible if the product from Nigeria could not meet the higher quality standard that commands higher price in the global market. In this way Nigeria product may be rejected at the global market.

Table3.5.2: Estimated Model for Cocoa Butter
Dependent Variable: Revealed Competitive Advantage of Cocoa Butter [D (LOGRCACB)]

Explanatory Variable	Coefficient	t-Statistic	Prob
Constant	1.467305	7.154059	0.0000
D(LOGRCACB(-1))	-0.424712	-5.782194	0.0000
D(LOGFDIA(-1))	-0.283818	-0.864678	0.3961
D(LOGGFCFAGRIC(-1))	0.605132***	3.64036	0.0014
D(LOGTAGRED(-1))	0.102953**	2.180606	0.0397
D(LOGEXCHR(-1))	-0.327868**	-2.218141	0.0367
D(LOGINFRATC(-1))	0.359828**	2.206283	0.0376
D(LOGECKWHPC(-1))	0.040379	0.05476	0.9568
D(LOGTFR(-1))	0.152734**	2.837396	0.0093
D(LOGWPCB(-1))	-0.329064**	-2.237829	0.0352
R-squared	0.908327		
Adjusted R-squared	0.86847		
Durbin-Watson stat	1.738996		

means significant at 5percent   * means significant at 1 per cent.
Source: Author's Estimation.

Cocoa Powder and cake
Table 3.5.3 shows three variables are significant determinants of revealed competitive advantage of cocoa powder and cake (RCACPC). These are government investment in agricultural research (TAGRED), electricity consumption per capita (ECKWHPC), and bank lending interest rate (LINTR). As shown in the table, the estimated coefficient of government investment in agricultural research showed that there is negative relationship between the variable and the competitiveness of exports of cocoa powder and cake. This is contrary to theoretical expectation. The estimated coefficient is significant at 10%. The magnitude, -0.14, suggests that a 10 per cent increase in government expenditure in agricultural research will lead to 1.4 per cent decrease in competitiveness of cocoa powder and cake. This is plausible when the investment in research by government could neither bring about new discovery nor commercialization of any research breakthrough in the product. The estimated coefficient of electricity consumption per capita is statistically significant at 5per cent. The magnitude, -0.39, suggests that a 10per cent increase in electricity consumption per capita will lead to 3.9per cent decrease in the revealed competitive advantage of export of the product. This is reasonable because in Nigeria public supply of electricity is generally known for its unreliability and high disruption costs which adversely affect production efficiency and competitiveness. As expected, there is negative relationship between the bank's lending interest rate and the revealed competitiveness of export of cocoa powder and cake. The estimated coefficient of bank's lending interest rate is -0.71 and it is statistically significant at 5per cent, implying that a 10per cent increase in bank's lending rate will induce 7.1per cent decrease in revealed competitive advantage of cocoa powder and cake. This is plausible because high bank lending rate may tend to increase cost of production which could make the product less competitive in the global market compared to other producing countries.

Table 3.5.3: Estimated Model for Cocoa powder and cake
Dependent Variable: Revealed Competitive Advantage of Cocoa Powder and Cake
[D (LOGRCACPC)].

Explanatory Variable	Coefficient	t-Statistic	Prob
Constant	-0.016441	-0.096757	0.9237
D(LOGRCACPC(-1))	-0.264674	-1.697283	0.1016
D(LOGGFCFAGRIC(-1))	0.430553	1.648219	0.1113
D(LOGTAGRED(-1))	-0.144253*	-1.737821	0.0941
D(LOGINFRAROAD(-1))	0.399568	1.438654	0.1622
D(LOGECKWHPC(-1))	-0.396603**	-2.0746	0.0481
D(LOGTFR(-1))	-0.415777	-0.744083	0.4635
D(LOGLINTR(-1))	-0.713655**	-2.322648	0.0283
R-squared	0.402776		
Adjusted R-squared	0.241985		
Durbin-Watson stat	1.991593		

means significant at 5percent   * means significant at 1 per cent.
 * means significant at 10%
Source: Author's Estimation.

4. POLICY RECOMMENDATIONS AND CONCLUSIONS
In order to enhance competitiveness of cocoa products in the global market, improvement of industrial activities and cocoa value chain should be given top priority attention. This will depend on the extent to which infrastructure investment is well targeted. Efficiency in spending on infrastructure should be geared towards improving electricity consumption, transportation system and repair of old damaged roads and build new ones that will effectively link village to village and village to industrial centres, urban towns and ports. In this way, the infrastructure investment will facilitates freight, lower transaction costs,

increase accessibility, specialization, market expansion and increased competitiveness of agricultural exports. The results indicate the compelling need for directing resources into increased production of the cocoa beans and diversify their output supply into domestic processing and manufacturing industries for generation of higher value-added products such as cocoa butter, cocoa powder and cocoa cake in order to reduce instability of export earnings and generate increased non-oil foreign exchange earnings for the country from manufactured products of cocoa rather than from the exports of the primary cocoa beans.

Effective investment on road construction and maintenance must translate to physical improvement of roads and areas of infrastructural gaps especially rural roads network should be given urgent and priority attention. This will create potential for effective linkage of agricultural actors including smallholder farmers and domestic processors to external markets. This will foster the development of cocoa value chain. Agricultural Research institutes in Nigeria should be supported with state of the art research equipments and adequate funding should be provided. The research institutes should conduct research that will generate commercialized scientific breakthroughs, new agricultural innovations and products of higher grade to meet international standards. Research, extension and farmers linkage should be strengthened with adequate logistics facilities that will induce easy contacts with actors in the production chain of agricultural exports and uptake of high productivity technology.

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