

ADAPTATION AND INDUSTRIAL GROWTH IN NIGERIA

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ABSTRACT

This study investigates the effect of Adaptive ability of Industrial Growth in Nigeria; with the ability of determining if adaptive ability through its characteristics (Asset Base, Knowledge & Information, Innovation) affects the growth of the industrial sector positively or negatively. To achieve the objective that are set in this study questionnaires were administered to four hundred and fifty (450) respondents across the three (3) states and four hundred and fifteen (415) were retrieved via the purposive sampling technique. Questionnaires that were properly completed were analyzed inferentially and descriptively in-order to effectively get a true picture in understanding of the effect of adaptive ability on industrial growth. The results revealed that Innovation (technology, use of modern facilities, production of variety of products, the use of ICT, the use of experts), Asset Base (quantity of products produced, number of trucks, evidence of borrowings), Knowledge & Information (exporting, environmental management professionals, marketing influence, distribution points, number of employed) goes a long way to determine the growth of Industries which further show that these mentioned factors above are vital to the industrial sector growth of any nation in areas of employment, output, income, infrastructural development, national income, foreign earnings, environmental management and marketing. The study revealed the reason why some industrial Companies have the edge above others. It is therefore recommended that adaptive abilities as presented in this study be a guide to private settings/ organizations and the government on the ways to improve the growth of the industrial sector and the nation at large in order to close the gap between the Nigerian economy and the industrial world.

Keywords: Asset-Base, Knowledge, Information, Innovation, Adaptive-ability, Growth.

Introduction

Industrialization has been generally argued as key determinant that propels the growth and development of any given society (Dickson 2011). Thus, Industrial growth implies the consistent improvement of all industry output, size, employment and productive activities over a period of time. It can also be described as a business that becomes increasingly popular or profitable in the industrial sector. Within the structure of the Nigerian Economy, the industrial sector can be said to account for a tiny proportion of the country's Gross

Domestic Product (GDP). More so, the oil and gas sector remains the major driving force which accounts for majority of Nigerian's export earnings, and about 85% of government revenue in Nigeria and this makes the country to rely heavily on oil for its survival at the detriment of industrialization. In this study we try to determine the effect that adaptive capacity has on the industrial growth but firstly, an exploration into the evolution of the industrial sector in Nigeria is important in the bid to appreciate this study.

The focus of this study which is Dangote Cement Company formally known as Obajana Cement PLC was incorporated on the 4th day of November 1992 as a public limited liability company and had a major task of importing and distribution of cement through Portharcourt and Apapa sea ports for the Nigerian cement market. In January 2007 and July 14th 2010 Dangote started manufacturing activities and the name Obajana cement PLC was changed to Dangote Cement PLC respectively (Deloitte, Touche & Ahmed, 2017). It shares were equally listed in the Nigerian Stock Exchange on the 26th day of October 2010 and in no distant time the company was listed on the Nigerian Stock Exchange Premium Board. The business activity of the company consists of manufacturing which are carried out in Benue State - Boko to be precise, Ogun State – Ibese precisely and Kogi State – Obajana precisely, sales and distribution of the product (Cement).

Alhaji Aliko Dangote is the founder and the Chief Executive Officer appointed as Chairman on the 4th day of November 2002 of Dangote group of companies. He studied Business Studies in the University of Al-Azhar Cairo in Egypt and also bagged honorary degrees from the University of Ibadan in Nigeria and Coventry University in the United Kingdom. His adaptive and entrepreneurial exploits have led to the expansion of his cement company in nine other African countries which includes; Ethiopia, Republic of Congo, Cameroon, Zambia, Tanzania, South Africa, Ghana, Sierra Leone and Senegal. Operations of Dangote Cement in these countries are controlled by environmental laws and rules that are binding to foreign companies that operate in these respective countries and any bridge of these laws attracts some fines. For Dangote Cement Company to operate in Nigeria, a Certification from the Federal Ministry of Environment after a successful assessment exercise coupled with assessments from other agencies like the Standards Organization of Nigeria and the Federal Ministry of Environment (which is also in charge of enforcement of the environmental laws) will have to be issued. It is also pertinent to note that the government where Dangote Cement Company operates issues various permits, licenses for the

company to operate without any challenge or disruption when it commences production and sales; although these approvals can be for a limited time frame that can be renewed whenever it lapses. When it comes to the distribution of the product, Dangote can boast of having the largest fleets in the Sub-Saharan and controlling the distribution/monitoring on its own with the aid of GPS based style to track the large number of trucks (about 7100 of them in 2017) that is used for the distribution of the cement. The profitability of any company depends on the cost of production of its products; the cost of production can be in the purchase of raw materials and this implies that the lower the cost of raw materials for production, the higher the profit of the firm and vice versa *ceteris paribus*. And so when it comes to profitability, Dangote tries to locate the company where it can source for raw material (which may include; lime stone, gas, coal), closeness to the market for the sale of its products, how conducive and friendly is the location etc. In Nigeria Dangote operates from three different locations (Obajana in Kogi State, Ogboko in Benue State and Ibese in Ogun State) is the main supplier of the product (Cement) with the total of 29.3Mta production capacity as at 2017.

In trying to show the industrial growth that is linked to the adaptive processes this research would engage key concepts/ characteristics within the framework of adaptive capacity which includes concepts such as;

- 1) Asset Base
- 2) Innovation
- 3) Knowledge & Information; will all be analysed in order to understand how and why, Dangote remains the leading cement producer in Nigeria despite the presence of other competitors within a challenging political and economic climate in Nigeria.

The challenges bedeviling industries in developing countries are enormous and have been highlighted by many scholars. These challenges include inadequate power supply, shortage of working capital, government policies and management issues (Dickson, 2011). Although, the construction sector specifically is one sector that

impacts directly on capital formation (even in the face of challenges mentioned above) given the amount of resources devoted on yearly basis by countries. However, the building block of Nigerian's construction sector are the cement industries because only very few construction work could be organized without the use of cement as key input in the design of structures/ building. Most importantly, this necessarily raises salient questions on how Dangote cement Plc have been able to wade off competition and sustain its market lead of the sector's aggregate output/ supply for more than two decades since its establishment in 1981. Consequently, it is on this premise that this study seeks to investigate adaptive capacity and industrial growth in Nigeria to determine if the edge experienced by Dangote cement is as a result of its adaptive capacity so that a proper guide/ road map will be revealed for other companies on ways to improve in the bid to help the growth of industrial sector as a whole.

This research work addresses the following questions; Is there a relationship between Asset Base of Dangote Cement Company and Industrial Growth in Nigeria? Is there any correlation between Knowledge & Information on the activities of Dangote Cement Company and Industrial growth in Nigeria? Do Innovation of Dangote Cement Companies influence industrial growth in Nigeria? These research questions are answered through these objectives. The main/broad objective of this study is to determine if Adaptive Ability has an effect on the Industrial Growth in the Nigerian economy. The specific objectives of this research work include; assessing the relationship between Asset Base of Dangote Cement Company and Industrial Growth in Nigeria, to examine if there is any correlation between Knowledge & Information of Dangote Cement and Industrial Growth in Nigeria, to determine if any relationship exists between Innovation of Dangote and economic growth. This study analyzes the adaptive processes/ capacity of Dangote Cement Company to determine its effect on the industrial growth of Nigeria thereafter show policy makers, politicians, sociologists and researchers the importance of having the ability/ capacity to adapt.

Literature Review

Adaptation involves conceptualizing, acting and thinking in-line with a set standard or outside the box even if it is in different sectors like; industry, trade, infrastructure, social norms, behaviours, education, health, agriculture, climate, finance-assets, environment, size of a firm, employment, technology, governance, international relation, economic policy and so on. Adaptive Capacity is the ability of being resilient for your own benefit to the changes that occur frequently in societies, nations and the world at large in areas of interest like; climate, production/ output, trade, consumption, health, finance, industry, employment, infrastructure etc. Having the capacity to adapt, entails innovation, entrepreneurially inclined, having the managerial ability to chase opportunities with the aim of achieving set goals (Anderson, Kreiser, Kuratko, Hornsby & Eshima 2015).

Adaptive capacity relates to the capacity of systems, institutions, companies and humans to adjust to potential instability/ crisis, to take advantage of opportunities or to respond to consequences. Emma Jakku (2010) defined Adaptive Capacity as a system's ability to recognize and renew itself in the face of change. He also defined it as the ability or capacity of a system to modify or change its characteristics or behavior so as to cope better with existing or anticipated external stress/ shocks/ fluctuations. From another perspective he defined it as a critical aspect of resource management that reflects learning and ability to experiment and foster innovative solutions in complex economic and social circumstances. There are many definitions of adaptive capacity which can be used to refer to a multitude of attributes and processes, there is still no general agreement within literatures regarding what these attributes and processes should be (Adger et al., 2004). These attributes in the context of this work include; Asset Base, Innovation, Knowledge & Information.

In some cases, Adaptation can be viewed as Entrepreneurship (through imitation) which is vital to the growth and development of developing economy; this is emphasized in the study of Bruton, Ahlstrom and Obloj (2008) and Shane (1997).

Brooks, (2003) explains that Adaptive Capacity is the ability of a system (be it the industrial, infrastructural sector or in innovation) to modify, adjust or vary/change its actions, features to reduce damages and to seize opportunities or cope with the result of stress and shocks caused by different entities in economy or the environment. Adaptive capacity in the context of industry, innovation and infrastructure implies the capacity to adapt to circumstances of variations/changes in the economic systems that affect the industry, infrastructure as well as innovation which is seen as key in the ability of the economy to improve irrespective of the changes that occur. Industry adaptive capacity (like Dangote cement company that is been studied) implies adapting in the face of uncertainty in the sector. This uncertainty can be in the area of technology, human factors like community unrest that tends to affect the progress of productive processes. In terms of innovation, adaptive capacity refers to in a way innovation which also can be seen as the conditions that enable people to anticipate and respond to change then recover hence minimize the consequences that is not favourable (Adger & Vincent 2005).

Industrial growth implies the increase in the capacity of industries to produce goods and services; by extension, some of the features that helps in these increase may include; ideological orientation of the government, natural resources, longevity of an industry, income through sales of products, human capital, physical capital and technological change etc. The combination of these factors listed above leads to an increase in the income, goods and services and generally output of industries all things being equal although the growth can be on a specific industry in the industrial sector. This growth can be in the prices of industrial produce or the quality of the products or in the output so produced. This can lead to economic growth when a country's production frontier moves outwards according to Samuelson and Nordhaus. Industrial growth implies the consistent improvement of industries' output, size, employment and productive activities. Some scholars defined industry growth as a business that becomes increasingly popular or profitable. The constant increase in the

volume of industrial produce in an economy is referred to as industrial growth by some clime. Industrial growth contains issues of increase/changes in the physical production of industries in a very short period of time mostly in a year, it can also be said to the increase in or more output and services measured by GDP or GNI. The expansion of the industrial system in one or more dimension so as to increase industry productivity is referred to Economic growth according Friedman. To Robert Solow increase in the capital of industries which is used to enhance further output production is referred to as industrial growth. To some countries the factors that causes increase in productivity/output can be the increase in labour force within a year, to some increase in capital, to some persistent increase in capital and labour of a country within a period of one year.

Asset Base has to do with the assets of Dangote Cement which are shared into three areas namely- firm's size and productivity, fleet of mini and mega trucks and the storage facilities whereas **Knowledge and Information** is considered in line with this work as the collection, analyzing, dissemination of knowledge and information in view to support adaptive activities which intends to be in the area of employment, sales for economic growth. This aspect when the research questions, objectives and hypothesis are raised focuses on the export of Dangote Cement, foreign earnings, types/specification of cements, the demand for the types of the product, sales of the product in relation to the distribution points across the country. **Innovation** in the context of this study involves; companies exploring new opportunities/ modern facilities in production and distribution and the impact on the sales of the product.

Innovative Growth Theory of Schumpeter

A major contribution to the theory of growth was initiated by Joseph Alois Schumpeter (1883-1950) due to his work on "Theory of Economic Development", which was first published in 1911. Schumpeter introduced into the economics the term "innovation" emphasizing the importance of an entrepreneur in the bid to attain industrial/ economic growth (Lavrov and Kapoguzov, 2006). According to

Him, for industrial growth to happen, changes in the economic activities/ spheres has to be obvious. These changes can be in the area of discovery which was especially caused by the activities of an entrepreneur. The Entrepreneur or Businessman or an Inventor like Dangote is the driving force behind industrial sector growth in the cement industry cum development in any society; He claimed that a Monopoly setting can help in the achievement of some vital gains like the benefits attached to the combination of new combinations of factors required for production, technological changes in production, creation of new products, exploring new grounds/markets (Lavrov and Kapoguzov, 2006). This theory by Schumpeter tends to be one of the key theory which this study hinges on because the adaptation which is seen from the activities of Dangote Cement like improved technology in production of varieties of cement products and its distribution gives us the information that the innovative growth theory of Schumpeter is very important to this study.

Keynesian Growth Theory

Keynes introduced in his work "The General Theory of Employment, Interest and Money" which served as the basis for the growth theories that other scholars after Keynes adopted. A key factor/ feature in the Keynesian model is the case of effective demand which he explained and clearly proven during the great recession that came with reduction in consumption that was caused by the decrease in income as a result of rising of unemployment levels which made savings drop drastically and so did investments. This led to Keynes advocating that macroeconomic policies through the government as an institution like the monetary policies (reduction in interest rates, bank reserve ratio) and fiscal policies (increase in government expenditure and tax reductions) be utilized if the market forces cannot help create and increase the aggregate demand that will propel the economy to a desirable state (UN, 2011). This assertion made by Keynes was a way of proffering solution to the depression of that time. He stated that if the economy is stimulated by the actions of government by the medium mentioned above, the

economy will bounce back. By extension, if the government makes the business environment conducive by the kind of business and environmental laws obtainable to the entrepreneurs and also make funds available via the reduction in tax, interest rates and reserve ratio these entrepreneurs will likely create employment, generate income and add to the growth of the country's GDP when they can assess more funds and invest appropriately. Although Keynes approach on saving the economy from depression was for the short run during which the depressed economy will pull out from the state of penury. The theory of Growth by Keynes proves vital as well in pushing this research work for better understanding. The actual growth rate in R. Harrod's theory (which is a theory that came into existence after the theory of Keynes) is determined by the growth rates of labor and capital productivity. The maximum possible rate of economic growth with full utilization of labor force is called in the Harrod's theory a natural pace (rate) which is possible with help of the government/state.

The Keynesian theory of increasing government activity serves as catalyst to the growth of many industries and economies and is considered one of the most appropriate even if many other theories of growth exist. According to this theory, active government participation is required/ needed if an economy is to grow generally and prosper. Therefore, monetary policy action by central bank and fiscal policy action by the government are required to direct the economy. These actions will bring about stability in output over the business cycles of both the private and government owned businesses.

Exogenous Theory of Robert Solow

Robert Solow the American economist with some other scholars were not in support of the intervention of government in the economy pushed forward by Keynesians rather they supported the theory of large firms (like their Asset base as viewed in this study) in a competitive market dictating the pace for growth to be achieved through the use of available resources (land, capital, labor). The methodological basis of their theories was based on the classical theory of the factors of production,

regarding labor, capital and land as independent factors of the formation of national product, as well as on the theory of marginal productivity, according to which, the income derived by owners of the factors of production are determined by the marginal products of these factors. Neoclassical listed some of the short falls that were experienced in the work of Keynesians in their growth theory; these shortfalls include; the disregard for other factors that enhances growth like technology related factors (skills, education), the underestimation of the ability of the market forces stabilizing the economy when the monetary system is stable (UN, 2011). Robert Solow's theory was outlined originally in an article "A Contribution to the Theory of Economic Growth" (1956), where he stated his assumption that a necessary condition for equilibrium of the economy is the equality of aggregate supply and aggregate demand. Aggregate supply in his theory is determined on the basis of the production function of Cobb-Douglas, which expresses the functional dependence between production volumes on the one hand, and the factors used and their combinations, on the other (Sharipov 2013). Solow's theory can reveal correlation/interconnections between sources of industrial growth namely; labor, investments, and technological progress. He made emphasis on the importance of population, technological improvement and savings as building blocks for great and improved production that will lead to growth if the economy is a stable state politically and financially although the population-capital ratio is tilting towards the population which is not good for the economy. Considering the theory of Solow, the technical progress is the only condition for continuous growth of living standards when measured as per capita income revealing that technological progress is the only guide towards attaining growth of welfare that is sustainable.

Eshima and Anderson (2016) embarked on a research on Firm Growth, Adaptive Capability, and Entrepreneurial Orientation and realized that Growth is linked to Entrepreneurial Orientation (EO). Although firm's ability to adapt is very important mechanism that helps in the achieving economic growth in trying to determine adaptive capability as a mechanism through which a firm's initial growth

influences the exhibition of future entrepreneurial action with the use of variables like, Entrepreneurial Orientation (EO), asset growth rate, sales growth rate, adaptive capability. In the model of this research work, the 2 stage least squares were utilized for the unobserved variables. In evaluating the model, the Chi- Square statistics was used.

For companies that desire to improve adaptively in this time of constant changes and fluctuations in the world, government institutions ought to be present in the support of these companies in ways that will help them thrive in the face of difficulty when it comes to taxation, financing as stipulated by Ospina and Heeks, 2010. For adaptive capacity to work according to intergovernmental panel on climate change (IPCC, 2001), these institutions of government have to be able to help enhance knowledge and information on environmental laws of the state, Innovation, security, Learning externalities and help improve the Asset base of companies. These institutions should be self-evolving if the conditions are favourable on the bases of present happenings. Daze et al; 2009 and Prowse and Scott (2008), states that in less developed countries that do not have a strong financial base cannot support its companies in times of world shocks like is been experienced in the world right now as a result of the coronavirus pandemic. This makes these companies suffer financial setbacks because of the inability to adapt appropriately. According to Ostrom (2005), principles, laws and rules are very important tools for the development of any setting that wants to succeed; as rules change so should companies and its settings change if they have not anticipated the change ahead of time and so evolve to accommodate changes in the rules of business which includes the environment laws.

Adaptive Capacity and Its Assessment was researched by Engle (2011) using vulnerability and resilience frameworks independently in order to determine the level of adaptive capacity to determine if it enhances the achievement of sustainable outcome in the face of climate change. This paper reviews the concept of adaptive capacity and various approaches to assessing it, particularly with respect to climate variability and change. In its

result, the study identifies opportunities for advancing the measurement and characterization of adaptive capacity by combining insights from both vulnerability and resilience frameworks. Increasing the Resilience and Adaptive Capacity of Cities through Entrepreneurial Urbanism research was carried out by Dobson, Nurlu and Jorgensen (2013) and revealed and suggested from the results that social entrepreneurial approach to urbanism may help to ensure that a sustainable and adaptive urban environment are not opposing aspiration to those of business; that we might shape resilient urban landscapes through, rather than simple whilst doing business bearing in mind the objective of this study is to determine if through entrepreneurial urbanism resilience and adaptive capacity can be achieved in cities. The variables in use in this research include innovation and collective creativity (means of Entrepreneurial Urbanism), urban fabric renewal and quality of public realm. This study reveals a number of drivers that has led city planning away from previous managerial models of governance towards greater levels of citizen participation.

An Empirical Study of Vietnam's Textile and Garment SME was carried out by Nguyen, Beeton & Halog (2015). A scoring method was applied to measure each firm's adaptive capacity based on 6 criteria that measured internal capacity, strategies for adapting and the actual level of adaptation. This research work investigates the relationship between the characteristic of textile and garment small and medium sized enterprises (SMEs) in Vietnam and their adaptive capacity using firm size, operation type, firm's age and its adaptive capacity as variables. The results show that ownership type does not have a statistically significant relationship with a firm's adaptive capacity.

Wong, Ho and Autio (2005) embarked on a research using economic growth, technological innovation and firm's information as variables for 37 countries in-order to determine the relationship that exists between the dependent variable economic growth and the independent variables which the total entrepreneurial activity (TEA) determines after a Cobb-Douglas production function was developed. The study identified four types of entrepreneurship and results show that the high growth potential

entrepreneurship which is linked to adaptive capacity has a significant impact on the growth of the cross-sectional countries studied.

A research on "The Effect of Entrepreneurial Activity on National Economic Growth" was carried out by Van Stel, Carree and Thurik (2005) to determine if entrepreneurial activities influence the GDP growth on the level of economic development measured as GDP per-capita. This paper investigates whether total entrepreneurial activity influences GDP growth for a sample of 36 countries using Economic Growth, Total Entrepreneurial Activities –TEA (in the form of self- employments) as variables. It was revealed in the study that Entrepreneurial activity by nascent entrepreneurs and owners/ managers of young businesses affects economic growth which is determined by upon the level of per-capita income. TEA has a negative effect on the poor countries and a positive effect on the rich countries.

The studies that was carried out considering adaptive capacity/ adaptation as an important variable like that carried out by Wong et al (2005), Stel et al (2005), used adaptive capacity and entrepreneurship in explaining the effect on the economies of several countries but this study considers the effect of adaptive capacity on industrial growth in Nigeria. Whereas, the studies that looked into entrepreneurship as part of adaptive capacity includes the work of; Acs et al (2006), Acs and Varga (2005), and Acs and Szerb (2007) all specified the effect which entrepreneurs have on the economic growth but this study is different from these literatures above because the focus here is the effect of industrial growth and not general growth. Secondly, the source of data will be primary contrary to the sited literatures above. The methods used in the sighted literatures for analysis are not the ones used in this study coupled with the characteristics (which were; Asset Base, Knowledge and Information, and Innovation). This makes this study quite unique and different.

Research Methodology

The research design that is employed in this study will be the Descriptive Research Design which is divided into the sampling research design and the

statistical research design. This research design was chosen because I appropriately explain the firm's adaptive capacity giving the coding that was done in the analysis of the results. Although, the study area that this study focused on are Kogi State, Benue State and Ogun State (the location of Dangote Cement factories (Obajana, Ogboko and Ibese) and their state capitals were visited). The sample size was determined using 95 percent degree of accuracy. The sample size formula specified by Amelda, Capistrano and Sarte (2010) was modified and applied.

$$S = 100 + N(e^4) \dots\dots\dots 1$$

S = required sample size; N = the population size; e = margin of error

Considering the work done by Almeda, et al (2010), in relation with possible sampling error/ limitation of the study, the margin of error taken was 0.05. In consideration to the modified formula above, the sample was determined to be a true representation of the population. The central limit theorem states/ reveals sample size of 30 and above as being appropriate to get the accepted figures for this study. This sample size was derived from the distribution in respect to the proportion of the number of inhabitants in each state capital and locality where Dangote Cement plants/ industry are located.

Table 1: Sample Size Presentation

State	Capital/ Area	Population/ Inhabitants	Sample Size
Benue	Makurdi/ Ogboko	5,741,815	136
Kogi	Lokoja/ Obajana	4,473,490	128
Ogun	Abeokuta/ Ibese	5,217,716	133
	Total Population	15,433,021	397

Source: Author's Computation

The sampling technique that is utilized in this study is the Purposive Sampling technique to capture the responses from Dangote Cement depots, plants, cement users across the three states that will be administered with the questionnaires and the stratified sampling specifically; this is so chosen because the sample which is being considered here are similar in a way for the bricklayers, builders (i.e. end users) and workers who in one way or the other have a connection in respect to the study.

$$IG = B_0 + B_1INN_{it} + B_2KI_{it} + B_3AB_{it} + U_{it} \dots\dots\dots 2$$

The econometric form reveals that IG (industrial growth) is the dependent variable which is affected/ influenced (negatively/ positively) by Adaptive Capacity in the forms of: AB - Asset Base, KI - Knowledge & Information, INN - Innovation. Innovation (INN): This is the practical implementation of ideas that results in the introduction of new goods or services or improvement in offering goods or services. Comprises of storage facilities, a limited liability, technologically inclined generally a dummy variable whose value is "2" if the firm is a limited liability company with storage facilities and is technologically

inclined "1" if the firm is not technologically inclined in general "0" if the firm is not in any of this category. Knowledge and information (K.I): Knowledge is the familiarity, awareness or understanding of someone or something, such as facts, skills which is obtained from the education on a field or area of human endeavor. This comprises of the operation type (exports, distributions points), a dummy variable whose value is "2" if the firm exports and distributes, "1" if it is supplying products to the domestic market only, and "0" if it is not in the market trading any product.

Asset base (A.B): This is an underlying asset that gives value to a company, investment or loan which is not fixed but determined by the market forces. Comprises of firm size (number of employees and fleet of trucks). Firm size, measurement by total number of employees "2" if the size of employees and fleet of truck exceeds 2,000 and "1" if it less than 1,000 in the zone. The data gotten via the primary source are derived from the 2 geopolitical zones of Nigeria (from residents, users/ bricklayers, workers and the Dangote Cement Depots and plants/ factories in Benue, Ogun and Kogi states). The data that is gotten from primary sources majorly (questionnaires/ schedules) and some

secondary sources (notes from my observation, records from Dangote Cement Company's economic activities).

According to Linkov et al., (2009), Scoring is a simple method to weight a variable that requires the integration of various lines of evidence before conclusions may be grasped. This technique has been broadly used to evaluate environmental valuation (McDonald et al. 2007) or measure institutions' firm's adaptive capacity (Gupta et al. 2010). This study applies the coding/ scoring method to perform the integration of evidence for all criteria of a firm's adaptive capacity and how it affects Industrial growth

in the cement industry in Nigeria. The table below further explains how a firm's adaptive capacity is measured using this method. As can be seen in the Table below, in all criteria, 3 and 2 represents a high level of adaptive capacity, 1 and 0 represents a medium and low level of adaptive capacity respectively. Total score of all criteria would be the adaptive capacity of a firm. The five main components of adaptive capacity that is going to be adopted partially which were identified by Schindehutte and Morris (2001) and modified includes; Asset Base, Innovation, Knowledge & Information.

Table 2: Expected relationships between firm's features (adaptation) and industrial growth

Variables	Description	Hypothesis	Expected Sign
Asset Base (A.B)	Firm size, measurement by total number of employees 2 if the size of employees and fleet of truck exceeds 2,000 and 1 if it less than 1,000 in the zone.	H ₁	+/-
Knowledge and Information (K.I)	Operation type: 2 if it is an exporting company and 1 if it is a non-exporting company.	H ₃	+/-
Innovation (INN)	Technologically inclined (Storage facilities, ltd liability): 3 if the Dangote is technologically inclined, 2 if it not technologically inclined.	H ₅	+/-

These criteria are all categorized under the variables mentioned above.

Criteria	Line of Evidence	Score
Internal Capacity: Staff Strength	Full time	2
	Part time	1
	None	0
Staff working on environmental management	Have qualification on environmental mgt.	2
	Have attended training on environmental. Mgt.	1
	None	0
Incentives packages for sales	Incentives to sales agent	3
	Incentives to distributors	2
	None	0
Welfare packages	Welfare package to customers	3
	Welfare packages to workers	2
	None	0
Publicity	Advert placement on media outlets	3
	Posters, paintings on buildings etc.	2
	None	0
Innovation and Technology	Production of 3 types of cement or more	2
	Production of two types	1
	Production of a type of cement	0
Distribution points	More than 10 points	2
	Less than 10 points	1
	No Distribution points	0

Results and Discussion

The structured research questionnaire used for the data collection was administered to four hundred and fifty (450) individuals in three (3) states where Dangote Cement Plants are located in two (2) geopolitical zones in Nigeria. Four hundred and fifteen (415) questionnaires were filled as returned (about 92.2%) out of the four hundred and fifty distributed questionnaires. This analysis therefore, was conducted on the basis of 415 questionnaires, which represents the end users of Dangote Cement, bricklayers in the states and the workers in the Dangote Cement plants in Benue (Gboko), Kogi (Obajana) and Ogun (Ibese). The number of questionnaires distributed to each state of the two (2) geopolitical zones and their rate of retrieval is presented in the table below. It was revealed that 33.9 percent of the total copy of the questionnaires administered for this study was retrieved from Benue state which accounts for one hundred and forty-one (141) out of the one hundred and fifty-one (151) copies of questionnaires that was administered. The table also showed that 32.3 percent of the total copies of questionnaires administered was retrieved from Kogi state and this implies that one hundred and thirty-four (134) out of the issued questionnaires of one hundred and forty-nine distributed. Whereas, in Ogun state, out of the one hundred and fifty (150) questionnaires that were distributed, one hundred and forty (140) were retrieved revealing a retrieval percentage of 33.7.

Therefore, from the table, it is clear that a total of four hundred and fifteen out of the four hundred and fifty copies of questionnaires distributed were retrieved. The information in the table have been presented in a chart below to show pictorially the number of the questionnaires distributed and those that were retrieved.

Estimation Results

This study investigated the effect of Adaptive Capacity on Industrial Growth in Nigeria using Dangote Cement Company as case of study. The empirical results are presented in this section according to the stated objectives in chapter one (1) of this study. The coded responses from retrieved questionnaires was converted/ transformed into mean values and the mean values were used as values for the regression analysis that was carried out as revealed below in-order to determine the relationship that exist between the Adaptive Capacity characteristics and Industrial Growth.

In the bid to estimate the relationship the exists between Asset Base and Industrial Growth in Nigeria, equation 2 which was specified under model specification of this study was estimated and the result gotten can be found in the appendix pages. For simplicity, the result in the table below is extracted from the estimated result. Estimates of the parameters in simple linear regression model of Asset Base on Industrial Growth in Nigeria.

Table 3:

Variables	Coefficient	Prob.	R-Squared	Adj.R-Sqrd	Prob(F-Stats)
CONSTANT	2.262204	0.0000	0.408848	0.394661	0.000000
AB KOGI	-0.859514	0.0000			
AB BENUE	-0.037329	0.4588			
AB OGUN	-0.121536	0.121536			

Source: Author's Computation

The values of the coefficients (estimates for constant and the independent variables; Asset Base for Kogi, Benue and Ogun) at different probabilities, the coefficient of all the variables are negative although only AB Kogi is significant at 5% level while AB for Benue and Ogun are not significant with values of 0.4588 and 0.1215. This is in variance with

the apriori expectation that the Asset Base tends to improve Industrial growth in any economy. The variables combined shows that 40% of the variations experienced in the industrial growth in caused by Asset Base of the sampled states. Whereas, the Prob. F-Statistics shows a general significance of the estimates. As seen in the result the Adaptive

Capacity through Asset Base of Dangote influences Industrial Growth.

Examining the correlation between Knowledge & Information and Industrial Growth in Nigeria

In the bid to estimate the relationship the exists between Knowledge & Information and Industrial Growth in Nigeria, equation 2 which was specified under model specification in chapter III of this study was estimated and the result gotten can be found in the appendix pages but for simplicity sake, the result in the Table above is also extracted from the estimated result. The coefficients values (estimates for constant and the independent variables; Knowledge & Information for Kogi, Benue and Ogun) at different probabilities, the coefficient of all the variables are negative except for KI OGUN which is positively related to industrial growth at 5% significant level. This is in variance with the apriori expectation that knowledge and Information improves Industrial growth in any economy. The estimates tell that 21% of the variation experienced in Industrial Growth is as a result of the activities of K & I in the three states studied. Whereas the Prob. F-Statistics shows a general significance of the estimates (the independent variables on the dependent variable). As seen in the result the Adaptive Capacity through K&I Dangote Cement Company Influences Industrial Growth.

The Extent to which Innovation is related to Industrial Growth in Nigeria

In the bid to estimate the relationship the exists between Asset Base and Industrial Growth in Nigeria, equation 2 which was specified under model specification in chapter III of this study was estimated and the result gotten can be found in the appendix pages. For simplicity, the result in the Table above is extracted from the estimated result.

The value of the coefficients of variables Innovation for Kogi, Benue and Ogun includes two positive and a negative values indicating a positive and negative relationship to the dependent variable. The constant term, INN for Benue and Ogun are positive at 0.089584, 0.225071 and 0.233678 respectively while INN for Kogi reveals a negative value implying a negative relationship with industrial growth; which is in line with the Innovative Growth

Theory of Schumpeter in which the importance of entrepreneurship led industrial growth was emphasized. The estimates express that 55% of the variation experienced in Industrial Growth is as a result of the activities of INN in the area of study. The Prob. F-Statistics shows that there is a significant effect of the independent variables on the dependent variable. As seen in the result the Adaptive Capacity through INN of Dangote Cement Company Influences Industrial Growth in general.

Discussion of Findings

Adaptive Capacity through Innovation and Industrial Growth in Nigeria

The study found Innovation as one of the characteristics of Adaptive Capacity has a more positive relationship/ effect on Nigerian Industrial Growth. Innovation in areas like; companies exploring new opportunities/ use of modern facilities in production and distribution and the impact of innovation on the sales of the product in this case of Dangote Cement Company is revealed to be a major determinant of Industrial Growth in Nigeria which collaborates with the finding of Lavrov and Kapoguzov (2006). In the case of new opportunities like variety of cement products which shows a higher value in the case of coding in this study points to the direction that the more innovation in form of variety of product, the more growth is witnessed in terms of sales of the products and its distribution which transcends to employment generation and improved GDP for the industrial sector. So is the use of modern facilities and exploration of new opportunities by the study area entails the positive relationship with industrial growth in Nigeria; by implication the higher the innovative activities, the higher the growth in the industrial sector in Nigeria.

Adaptive Capacity through Knowledge and Information and Industrial Growth in Nigeria

It was found out that knowledge and information aids industrial growth more positively in Nigeria through the evidence shown it the result from the analysis on the adaptive capacity of Dangote Cement Company. The analyzed data points to the direction that knowledge and information on type of cement that is more in

demand and the information/ knowledge on importation goes a long way to direct the company under study on the way to improve or increase production and by so doing increase sales. This is in line with the benefit of large scale production as advocated by the work of Robert Solow on the Exogenous Theory of growth in the research carried out by Sharipov (2013). In the theory of Economic Growth by Solow, the necessary condition for growth is through equilibrium when the quantity demanded and supplied are equal, this equality can be actualized by the knowledge and information so made available. The growth in the industrial sector can by this analysis be enhanced through adaptive capacity in the area of information and knowledge on the area of study and propel industrial growth the more.

Asset Base and Industrial Growth

From the result Asset Base which was categorized in the form of firm size, fleet of trucks used for distribution of Dangote Cement, the Depot and distribution points available; is negatively related to Industrial Growth. Increase in the Asset Base of Dangote Cement Company does not improve positively the level of Industrial Growth experienced. This might be so because the gap between the Asset Base and the impact on the growth of the industrial sector. As stipulated by the Exogenous Theory of Robert Solow the growth of the Industrial sector can be related to the theory of Large firms therefore, as the size of firm, fleet of trucks, distribution points will either improve or derail the level of Industrial Growth in general. Increase in the Asset Base of a company tends to increase the level of employment, income, Gross Domestic Product invariably improving the level of Industrial Growth in the country (this is also revealed by the increase in trading activities as stated in the work of Xavier Sala-i-Martin (2001)); this is contrast to the position of the Keynesian on the support of government in enhancing employment, bail outs to facilitate employment generation.

Summary, Conclusion and Recommendation

The main objective of this study is to determine if Adaptive Capacity has an effect on Industrial Growth in Nigeria. Accordingly, the study

tried to; (a) assess the relationship that exist between Asset Base of Dangote Cement Company and Industrial Growth in Nigeria; (b) examine if there is any correlation between Knowledge & Information of Dangote Cement and Industrial Growth in Nigeria; (c) determine if any relationship exists between Innovation of Dangote Cement Company and Industrial Growth in Nigeria. For these objectives to be achieved, the study administered a structured questionnaire to Four Hundred and Fifty (450) and Four Hundred and Fifteen (415) of the questionnaires were retrieved from the respondents from the three (3) states visited in two (2) geopolitical zones in Nigeria that were technically chosen through a purposive sampling. The questionnaires that were completed were so analyzed with the use of simple regression technique in order to have a good understanding of the effect of the different Adaptive Capacity characteristics on Industrial Growth. From the estimation carried out, the following results were obtained.

1. Asset Base of Dangote Cement was found to be positively related to Industrial Growth. Implying that Asset Base was found to be a determinant of Industrial Growth in Nigeria using the study areas as a focus. This finding is in collaboration to the findings of Folke et al (2002), Turton (1999) and McCay (2002). The more the Asset and Financial Base of the company under study improves it points towards the fact that more economic activities tend to be carried out improving the Industrial sector in different capacities like in employment, productivity, localization benefits.
2. The study also found Knowledge & Information of Dangote Cement to be a positive function of Industrial Growth making Knowledge & Information a key determinant of Industrial Growth considering the sampled areas (states focused on) for the study. The knowledge and Information on the quantity and specification of cement sold tends to direct the company on goods to produce the more hence positively affecting the Growth of the Industry

specifically and the sector generally. The more information and knowledge on industrial economic activities help in positioning the sector to be better.

3. The study also found out that the edge that is experienced by Dangote Cement Company in the construction sector is as a result of Adaptive activities engaged in by the Company. these Adaptive Capacity are broken into the characteristics earlier listed (A.B, INN, I.E, K&I, FFLDMG).

Conclusion

Based on the findings, this study reached the conclusions that, Asset Base significantly determines the level of Industrial Growth in Nigeria putting into consideration the characteristics that are aligned to Asset Base of the study area/ company; Knowledge and Information which is studied in the context of Dangote Cement Company significantly influences Industrial Growth in Nigeria; Industrial Growth was also significantly determined by Innovation (which includes the use of modern facilities in production). To improve the level of Industrial Growth be it on the construction industrial sector or the other areas of the sector, there is need for the Nigerian Government to make the environment conducive (like tax relief, constant electricity supply) for effective growth in the sector. This recommendation is made because the findings from this study show that the innovation tends to improve the level of Industrial Growth for Nigeria and so it will be beneficial for a conducive environment to be adopted for a greater benefit. Increase the Asset Base of companies and in this case the construction industry, the government just like Keynes recommended should make available funds with low interest rates for companies that wants to invest in the expansion of their Asset Base in order to increase the level of employment generation, increase in infrastructural facilities, and improvement in the GDP. This will go a long way in increasing/ improving the Industrial Growth of Nigeria.

The government should engage in broad sensitization of the need for a wholesome industrial growth and development in Nigeria. This

sensitization should be in collaboration with the Bank of Industry/ development banks and industrial strategies like the use of fiscal policy measures- provision of financial facilities both local and foreign, protection of export industrial products, which will improve not only the construction sector of the industry but the industrial sector generally. To bridge the gap between Dangote Cement Company and other Cement Companies, Adaptive Capacity has to be taken seriously in-order to boost the industrial growth on one hand and secondly improve general economic development in Nigeria.

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