PETROLEUM PRODUCTS DISTRIBUTION SYSTEM IN NIGERIA
Nature, Mechanics and Challenges

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ABSTRACT
This study x-rayed the Nigerian petroleum industry with special focus on its nature (in form of units, players and regulatory authorities), their mechanics of operations and the challenges faced by them as it impart on citizens' welfare and the economy. Extant literature on the dynamics of regulations that created the actors and guide their roles and functions in the industry were reviewed. To fit a link between practice and theory, distribution theories and models were lucidly discussed pointing out how the Nigerian economy became constraint as a result of non-adherence to popular distribution principles, ethos and presence of sharp practices. This is in addition to regulatory incapacity to affect control. Further model analysis provides insights that underscores distribution paradigm in the industry. These include supply and demand chain management and how they integrate to predict the flow of products, information, finance, risk etc., with special focus on attaining efficiency in the industry. In this dimension, comparative analysis were made between the Nigerian experience and countries like Malawi and Kenya especially in pricing. Factors that impinge on effectiveness of petroleum distribution system in the economy discussed include: constrained infrastructure, price instability and the open tender system among others. The study concludes that given sharp practices in the industry, connivance of regulatory authorities and price instability, the industry can be described as anything but stable – this has its negative impact on the citizens' welfare and economy. Recommendations suggested include building domestic refining capacity, curbing militancy in the Niger Delta, and improving transparency in the distribution system.

KEYWORDS: Distribution, Channel system, Flows, Effective distribution, Petroleum products, regulation.

INTRODUCTION
Channel analysis is important in evaluating marketing system because it indicates how the various market participants are organized to accomplish the movement of products from the producer to the final consumer. Distribution management has received in recent years a great deal of attention by researchers and practitioners. Effective distribution management will lead to reduction of the total amount of resources required to provide the necessary level of customer satisfaction and improve on customer service through increased product availability and reduced order cycle time (Banomyong and Supatn, 2011); engage in information exchange (forecasting techniques, inventory management, delivery) and structural collaboration (just-in-time system, outsourcing, vendor-managed inventory and co-locating plants) (Henry and Barro, 2009; Raja, Mazlan & Ali, 2006); relationships with downstream supply chain partners to create end-customer value (Iyer, 2011) and maximize benefits and minimize costs along the distribution chain (Chima, 2007). Thus, the nature of distribution management becomes visible to participating companies in the petroleum industry with successful implementation in the ever changing global environment.

A distribution chain is a dynamic process and involves the constant flow of information, materials, and funds across multiple functional areas both within and between channel members.
Members in the chain need to cooperate with their business partners in order to meet customer's needs and to maximize their profit. However, in the Nigerian petroleum industry it is a very difficult task managing the multiple collaborations because there are so many firms (government agencies and marketers) involved in the supply chain operations with their own resources and objectives. The interdependence of multistage processes also requires real-time operation and decision making across different tasks, functional areas, and organizational boundaries in order to deal with challenges and uncertainties. The strategic move of focus for mass customization, quick response, high quality service and customer satisfaction cannot be achieved without more complex cooperation and dynamic structure of distribution chains.

Over the years, the oil industry has continued to face growing challenges, from stricter government regulation, constrained infrastructure, price control, open tender system, advance payment of taxes, political risks, competition, emergent new comers and political hostilities. These have affected growth and output (Barr, 2004). Due to the scramble for resources, many oil companies have been driven to explore and produce in some of the most hostile and harsh environments, which in turn tend to be extremely costly. Also, there have been concerns in the industry about the growing scarcity of natural resources, which underlies fears of not being able to meet production levels and goals. The main challenge facing the oil industry is not the availability of oil resources, but putting these reserves into production and delivering the final products to consumers at the minimum cost possible. Thus, a solid distribution chain management program is of dire necessity (Chima, 2007).

In the oil industry, the distribution-chain network is composed of shipping via vessel, oil tankers, and pipelines that may run across multiple states (Kimani, 2013). This network is used to transport crude from wellhead to refinery for processing, to transport intermediates between multi-site refining facilities, and to transport finished products from product storage tanks to distribution centers and finally to the customers. Any disruptions arising in the supply chain can have tremendous adverse effects in achieving operational efficiency, maintaining quality, profitability, and customer satisfaction (Chima, 2007). The adverse events that can happen due to uncertainty in supply of crude include variations in: demand, transportation, market volatility, and political climate. Hence, Shah, Li, and Lerapetritou (2011) propose that to effectively model a distribution chain design the dynamics of the supply chain ought to be considered and data aggregation techniques for the extensive data set should be employed.

In an effort to manage their supply chain operations and reduce costs, oil marketing companies are currently outsourcing their logistics functions to third-party logistics companies to manage their supply chains. Oil companies also engage in strategic planning, E-procurement, close partnership with suppliers, use of external consultants, outsourcing none core activities, dealing with few suppliers, engaging in vertical integration and Supply Chain Benchmarking. Inspite of these lofty efforts, challenges still exist in the nature and mechanics, with which the NNPC and major marketers allocate coordinates and supervise petroleum products distribution within the Nigerian economy. The focus of this study is to examine clinically the nature and mechanics of distribution in the sector with a view to identifying those often ignored factors that create
consumer apathy and constraints the effective distribution of products to target areas of needs. Attempts will be made to proffer strategic solution that can be enduring in the sector.

LITERATURE REVIEW

The Nigeria Petroleum Industry: Nature & Mechanics
In the last three decades, the petroleum industry has been of strategic importance to the Nigerian economy accounting for as high as 78% of Gross Domestic product and up to 90% of the country's total annual revenue and foreign exchange earnings (National Bureau of Statistics, 2008).

The federally collected revenue from 1965 till 2007 shows that the oil sector maintained and continues to maintain its dominance accounting for over 90% of total revenue in some years (National Bureau of Statistics, NBS, 2008). At any rate, since 1980, the percentage contribution of the oil sector to the total government revenue has not fallen below 70% of the total receipt (NBS, 2008). This tends to demonstrate the strategic importance of the petroleum resources in the Nigerian economy.

The petroleum industry can be classified by type of actors or by sector. The actors in the Nigerian industry consist of both private and public organizations (NNPC, 2006). The public actors are the government agents and functionaries such as the Nigerian National Petroleum Corporation (NNPC) and its subsidiaries, the Department of Petroleum Resources (DPR), the petroleum products pricing regulatory authority (PPPRA), among others. The private segment consists of both indigenous and foreign actors. The indigenous sector consists of private independent marketers. As far back as 1978, the concept of independent petroleum products marketing was introduced with a view to bringing indigenous independent marketers to that sector of the industry. According to Edoreh (2012), in 1979 a year after the scheme of independent marketers was introduced, there were not more than 20 (twenty) independent marketers. By 1993, the number had risen to 1000. Today, the indigenous independent marketers are well over 7,948 (NBS, 2008). As a measure of the growing involvement of the indigenous petroleum products marketers in the economic development process of Nigeria, it is interesting that in 1981, they accounted for less than half – percent in terms of volume of petroleum products marketed in Nigeria. By 1998, they had captured about 25% of the market (NBS, 2008).

Currently, they account for nearly 40 % of the volume of products marketed in the country (NNPC, 2010). In terms of outlets, the major marketers have 2,218 while the Independent marketers have 7,948 outlets. The NNPC has 18 mega stations nationwide as at June, 2010. These indigenous independent marketers are competing with the established big (foreign) multinational enterprises usually referred to as the Major Oil Marketers (MOM) comprising: Mobil Oil Nigeria Plc, MRS Nigeria Plc, Total Nigeria Plc, Con oil Plc, Oando Nigeria Plc and African Petroleum Plc. These six major oil marketers control about 60% of the market (NNPC, 2010). There are two major classification of petroleum industry by sector. These are the “Upstream” and “Downstream” sectors.
Activities in the Upstream Sector include:

- Geodetic survey
- Civil works such as site surveys and preparation of drilling locations
- Seismic data acquisition
- Drilling operations
- Geological activities
- Crude oil transportation and storage
- Exploration and production

The downstream sector of the petroleum industry which forms the basis of this study is characterized by such activities as

- Gas treatment
- Crude oil and gas conversion into refined and petro-chemical product and
- Transportation and distribution of refined products

In the downstream sector, activities are progressively falling within the control of private entrepreneurs, especially the indigenous independent marketers. It is the policy of the federal government that petroleum products be distributed by private companies. To this end, government divested a sizeable portion of its interest in oil marketing companies by selling some of its share to the public through the Technical Committee on privatization and commercialization. In view of the strategic importance of the industry in the economy, in 1999 the Federal Government formulated strategic objectives for the effectiveness of the industry (according to the Nigerian National Petroleum Corporation Statistical Bulletin, 2006) as follows:

- Maintaining self-sufficiency in refining
- Ensuring regular and uninterrupted domestic supply of petroleum products at reasonable price
- Establishing facilities and infrastructure for the
- Production of refined product targeted at the export market and support domestic petrochemicals
- Providing gainful employment and enabling Nigerians to acquire technical know – how in refining and distribution business.

The above listed strategy was to be the guiding principles for the effectiveness of the industry. Government believed that the above stated aspirations could be achieved through twin process of deregulation and liberalization of the downstream petroleum sub – sector. In spite of the efforts of government, the industry is still characterized by series of problems. The problems include the following: Scarcity of petroleum products leading to long queues, at the service station in some states and town of the country at regular intervals, Inadequate or constrained infrastructure, Price control issue, Open tender system, Payment of taxes, Low capacity utilization and refining activities at the nation's refineries, Rampart fire incidents as a result of mishandling products, Pipelines vandalization, Large scale smuggling due to unfavourable economic product at home and higher borders prices with the neighbouring countries and Low investment opportunities in the sector. On 14th August, 2000 the Federal Government of Nigeria
set up a special committee on the review of petroleum products supply and distribution. The members of the committee were drawn from various stakeholders and other interest groups to examine the problems of the downstream petroleum sector. The committee submitted its report to the government for study and approval.

According to Oluleye (2004), on 29th September, 2003, the Governing Board of the Petroleum Pricing Regulatory Authority (PPRA) announced full deregulation of the downstream petroleum sector. This implies that the Nigerian National Petroleum Company (NNPC) will be paying market prices for crude petrol, diesel and kerosene. As highlighted by Oluleye (2004), following the announcement, the downstream operators embarked upon massive investment in the sector, culminating in building and commissioning of jetties, depots, building of new service stations with new pump deployment. There were also the expansions of trucking fleet, modernization of HSE equipment and considerable investment in the training of staff. Okafor (2006) observed that the policy of deregulation has globally been embraced by several countries in order to lessen the public sector dominance and for developing a liberalized market while ensuring adequate supply of products. According to Okafor (2006), such is the story in Peru, Argentina, Pakistan, Chile, Philippine, Thailand, Mexico, Canada, Venezuela, Japan and U.S.A. In those countries complete deregulation has brought significant turning point in the success story of the oil industry.

**GENERAL THEORY OF DISTRIBUTION**

In its very simple term, distribution consist of the series of logistic activities involved in the planning, organizing for and conveying items (goods and services) from places of manufacture to locations where they are needed (Ekakitie, 2015). It involves channels units or intermediaries, organized and specialized in their respective core activities participating (as channel members) in the conveyance process. This warrants the conceptual position of scholars like Jibril, Garba and Bukar (2009) when they see distribution as a set of independent units involved in the process of making products and services available for use or consumption in more than one location.

Within the context of the theory of distribution, market intermediaries (agent merchants, wholesalers and retailers) exist to perform defined activities, see Ekakitie (2004, 2010), Jobber, (2004). They help the producers continue in the task of production enabling them to focus their capacities efficiently. Many marketing literature have painted positive geometrical outlay of benefits accruable to enterprises when channel members take off the burden of distribution from producers. Whereas, using the constrained model, \(4 + 4 = 8\) producers can only make delivery to consumers 8 times; the dynamic model \((4 \times 4 = 16)\) has an intermediary achieving as much as 16 contact deliveries in the task of distribution of needed products. Thus creating more business activities and putting more capacities to use including man in the task of creating/maximizing satisfaction consumers along the value chain.

In practical terms, channel members perform deeper and more integrated functions. These include: information gathering, promotion, contact, matching, negotiations, physical distribution, financing and risk taking, etc. Channel members are known to play in two types of markets, the industrial and consumer markets.
In the task of distribution and channel management, Schoell and Guiltinan (1992) identify many dimensions of flows captured as 'multivariate flows and mixes'. These involves series of flow patterns warranting the pull and push combination strategies. Thus, as captured in the diagram below, channel flows can be physical flows, risk flows, and financial flows along the supply chain. Other forms of flows are: negotiation flows, promotional flows, payment flows etc. In the Nigerian Petroleum Industry, a series of these combinations are easily observed as actors within the sector engage in a series of flow maneuvers to get products to final consumer, industrial end-user or consumer. It can be noted that the flow interchange is symbiotic.

Fig 1: Multivariate Flows & Mixes


In the petroleum industry, marketers often adopt the Pull and Push strategy to achieve efficiency in the supply chain. In its explanatory context, Ekakitie (2010) posits that the push strategy is a sales building technique producers engage actively in product promotion to final buyers/users. Conceptually, the pull strategy is about producers focusing promotional efforts at the final buyers through intermediaries upwards. One can notice that the later strategy is adopted by NNPC Mega station operators across the country whereas, Major marketers like Total, Oando, Mobile, etc, adopt the pull strategies via engaging intermediaries. In all, product quality, prices and delivery time are constraints using the pull strategy.

MODELS OF DISTRIBUTION: Demand & Supply Chain Management
In the annals of marketing and distribution theory, channel management and the maximization of its objective function provide a lot of leverage for the attainment of not only efficiency within the channel system, but operating it profitably. Two such theoretical and highly practical approaches to managing distribution (including petroleum products) of goods effectively are herewith discussed.
Supply Chain Management, SCM

SCM has grown since the early 1990s when it first appeared in the marketing lexicon. SCM can be defined as 'the management of upstream and downstream relationships with suppliers and customers in order to create enhanced value in the final market place at less cost to the supply chain as a whole (Christopher, 1998). Overtime, the synergy between SCM and marketing has been acknowledged by scholars. This has led Piercy (2002) to conclude that its maximization can redefine superiority competitively in many ways. SCM is about making the supply chain 'lean' (Womack and Jones, 1996) and 'agile' (Goldman, Negel, et al, 1995). SCM thus propels delivering 'more' with 'less' resources.

Demand Chain Management, DCM

DCM as a model of marketing is geared towards supporting the marketing orientation. It entails research efforts to first ascertain what the market (customers) want, then designing channel strategies to deliver products effectively and efficiently down the chain. It is geared towards complementing the old benefits of supply chain management via leveraging on its benefits. Thus DCM, as Juttner, et al (2004) stressed, is geared towards:

1) Integrating the demand and supply processes
2) Managing the digital integration
3) Configuring the value system, and
4) Managing the cross-functional working relationships between marketing and supply functions.

The need to find synergy between demand and supply on the one hand and marketing functions on the other is a result of vociferous contestations that marketing has 'not been very good at managing out-of-box and across boundaries functions'. In essence, the benefits of DCM and SCM within the context of the distribution process can be summed up in the following statement of Juttner, et al (2004).

"The most recently introduced approach of demand chain management (DCM) seems to capture the proposed synergies between SCM and marketing by starting with the specific customer needs and designing the chain to satisfy these needs, instead of starting with the supplier/manufacturer and working forwards (Heikkilä 2002). Such integration between customer-facing and supply functions seems mandatory in today's marketplace, where customers benefit from having real-time access to their accounts, making real-time changes in their customized product configuration and communicating their individual service requirements".

The matrix of benefits derivable from the efficiency of DCM is situated within the context of the roles it plays in the marketing process. The table below captures its existential essence.
Integrating the Demand and Supply Process

Facilitating the process integration by disseminating customer and market information;
Considering the effect of marketing activities from an integrated process perspective.

Managing the Digital Integration

Fostering a demand rather than a supply-based integration of Information needs.

Configuring the Value System

Linking external, customer-facing segmentation with internal, value system-based segmentation of production, logistics and sourcing;
Obtaining knowledge about changes in customer needs as a basis for structural adaptation requirements of the value system.

Managing the Cross functional relationships between Demand and Supply Functions

Exchanging information with supply functions, i.e. providing timely information on: defined customer segments; new customer/product opportunities; planned promotions; feedback on over/under service delivery and, seeking information on: lead times, capacity and pipeline costs;
Seek collaboration with supply functions by working towards a mutual understanding of the information exchanged and collective goals.

Table 1: The Roles of Marketing within DCM
Small wonder Jüttner et al, (2004) emphasizes a contextual proposition the synergy derivable from the interactivity of DCM & SCM and the wider needs of marketing as an enterprise function.

“From a DCM perspective, marketing would need to share the customer information with other departments, involve the knowledge of other departments into their decision making and redefine (and possibly limit) its responsibilities within the integrated demand and supply process. Rather than acting from the position of the function who owns the customer, marketers would need to strategize with supply functions to create new ways to go to the market, understand and translate marketing initiatives into supply chain drivers and improve their awareness of the company's operational constraints. Collaboration between supply functions and marketing, needs to ensure that supply functions are involved in the marketing planning at an earlier stage, are involved in customer priority decisions and, most importantly, need to be able to reject marketing decisions if they are not financially viable to the business.”

This summation within the context of this study is apt. The synergy further gives breath and life to the channel management system when it further tries to integrate activities of 'customer buying cycle', the 'demand processes' and its complemented 'supply process'. This systemic process is implicated in the diagram below. It captures the cyclical process of awareness creation, evaluation, customer, decision and purchase decision process. A complex of these matrix and their integrative/interactive variables makes the channels management system the hub of the
marketing function across a myriad of enterprises globally.

**Fig 2: Integrating DCM/SCM Activities and Marketing Functions**

Source: Uta Jüttner, Susan Baker, and Martin Christopher, 'Demand Chain Management – Integrating Marketing and Supply Chain Management' Publication of Cranfield School of Management, Cranfield, Bedford, MK43OAL England, 2004. e-mail: u.b.juettner@cranfield.ac.uk

According to the authors, the three layers of the model stress firstly, the integration of the customer into the value creation process as proposed by Vargo and Lusch (2004). Secondly, in line with the conceptualizations of relationship marketing and CRM, the buying cycle acknowledges the dynamics in customer relationships (Zablah et al. 2004). Thirdly, by linking the activities in the demand process with those in the supply process, guidance to implementing the process integration can be derived. Any process can usually be divided into sub processes and activities and therefore, the level of abstraction is arbitrary.
Model of Distribution Chain in the Petroleum Industry

Scholars often claim that the oil supply chain should be built based on value-adding process of oil merchandizing. Li, and Wu (2004) put forward the supply chain of petroleum industry according to the process of oil products. This model mainly contained raw material supply, oil exploration and development, transportation, refining, distribution and other aspects. Zeng (2005) considered that, from the characteristics of the oil industry, the oil and gas exploration and development, storage and transportation, refining, chemical industry, sales can become a supply chain system.

This study argues that the general oil supply chain should include the following nodes: oil machinery manufacturing, oil exploration and mining, oil transportation, oil refining, product sales, distribution companies and customers. Of course, capital flows are accompanied by the flow of goods. Because of materials flow among the various enterprises and other investment and financing activities, there is a large number of capital flows in petroleum industry supply chain. In addition, the supply chain also includes the flow of information between the various nodes (Zeng, 2005). When the information flows between the various nodes i.e level by level, it will form a closed information flow. Based on the above analysis, this study figured the structure of oil supply chain (figure 1). Petroleum Machinery Production Company will produce the related equipments supplied to the oil exploration and mining, and the oil transportation pipeline is essential supplies; oil exploration and mining company is an important node whose activities will result in crude oil; crude oil gets to the petroleum refining and chemical companies through transportation. Some of the products will go directly to the market, while the other part of the product will be the raw material for chemical companies.

![General Composition of the Oil Supply Chain](image-url)
The final product will reach end-users through sales companies and distribution companies. Throughout the process, each node in the supply chain shares information; and the movement of goods will result in capital flows, and other potential financial transactions lead to two-way funds flow.

**CHANNEL MANAGEMENT: Distribution Challenges**

Any disruptions arising in the distribution chain can have tremendous adverse effects in achieving operational efficiency, maintaining steady price and product quality, profitability, and customer satisfaction. This study identifies the following as challenges often ignored, yet potent in subtracting from effective distribution and imparting negatively on the economy:

1. Constrained infrastructure,
2. Price instability, and
3. Open tender system

**Constrained Infrastructure**

The key element in a distribution or logistics chain is the nature of transportation system which joins the separated activities. Transportation occupies one-third of the amount in the logistics costs and transportation systems influence the performance of logistics system hugely. Transporting is required in the whole production procedures, from manufacturing to delivery to the final consumers and returns. Only a good coordination between each component would bring the benefits to a maximum (Chima, 2007).

In the oil industry, the distribution-chain network is composed of shipping via vessel, oil tankers, and pipelines that may run across multiple states (Kimani, 2013). This network is used to transport crude from wellhead to refinery for processing, to transport intermediates between multi-site refining facilities, and to transport finished products from product storage tanks to distribution centers and finally to the customers. Any disruptions arising in the distribution chain can have tremendous adverse effects in achieving operational efficiency and customer satisfaction. The adverse events may happen due to uncertainty in supply of crude, demand, transportation, market volatility, and political climate. Hence, Shah et al. (2011) opine that to effectively model a supply-chain design problem, the dynamics of the supply chain ought to be considered and data aggregation techniques for the extensive data set should be employed. Barr (2004) found that supply fluctuation was due to capacity adjustment lead time, production lead time, order processing delay and order wait time. Sweeny (2005) observed that the reversed bullwhip effect is caused by factors such as deficient information sharing, insufficient market data, deficient forecasts and capacity issues. Facilities with mass production are responsive to supply variability while customization platforms are prone to longer production lead times. Business processes sub optimization by design or default can lead to a butterfly effect where a small variation can lead to system wide variation. Most companies in the oil industry are no longer simply contend with price as a determinant in procurement services due to huge cost of procuring some facilities and also sustainability of the supply and ability to meet unpredictable and short notice supply instructions (Webster, 2004). Ability and expertise override costs where the cost curve minimization is already achieved.
Sweeny (2005) argues that managing the information flows is the most critical of these activities. This is because the flow or movement of materials or money is usually triggered by associated information movement. Lalwani et al (2006) proposed that current developments in systems thinking and continuous system simulation, when applied within the context of an operations management framework, may offer the good design of supply chain and improve in supply chain performance. Shah et al. (2011) opinion is that a typical petroleum industry distribution chain is composed of an exploration phase at the wellhead, crude procurement and storage logistics, transportation to the oil refineries, refinery operations, and distribution and transportation of the final products. The upstream activities (exploration, development and production of crude oil or natural gas) and downstream activities (tankers, pipelines, retailers and consumers) are two important activities in the petroleum industry (Mohd and Ali, 2009).

Distribution chain management in the oil and gas industry requires the company to integrate its decisions with those made within its chain of customers and suppliers. This process involves relationship management of the company to their customers and suppliers. A firm can create long-term strategic relationships with their suppliers and in most cases there is a collaborative process between the oil and gas company with its suppliers (Chima, 2007). Kimani (2013) conducted a study on supply chain management challenges in Kenya petroleum industry and noted that Kenya's petroleum industry faces supply chain challenges such as lack of strategic stocks, relatively high petroleum prices compared to other East African countries, frequent fuel shortages, sub-standard products and diversion of products destined for export back into the country. He explored challenges facing implementation of effective supply chain management practices in petroleum industry in Kenya, a case of National Oil Corporation. Specifically the study sought to explore the influence information technology, supply chain design, people issues and partnership/collaboration issues to the implementation of effective supply chain management.

However, most firms have not been able to formulate the right strategies required to achieve this objective in Distribution Chain Management (DCM). This call for a strategic fit of an organization's core competencies, strategy and core capability. He suggested eleven critical factors as the best practices: operating policies, linkages within supply chain firms, improved performance, information technology systems, strategic alliance, performance measures, goal orientation, customer relationships, guidelines and procedures, supplier selection and supplier evaluation. When benchmarked, these practices were found to be universal and compares with the best practices globally. The petroleum industry can be characterized as a typical supply chain network where all levels of decisions (strategic, tactical, and operational) may arise. Management of the petroleum supply chain is a complex task due to the large size of the physical supply network dispersed over vast geography, complex refinery production operations, and inherent uncertainty.

**Price Instability**

Of all countries producing oil in the world eight of them have price controls, including all five West African countries (Jain et al., 2009). The eight countries use different variations of an import-parity structure with international spot reference prices, market marine freight rates, and
the dollar-local currency exchange rates as the three key short term adjustment parameters. With
the exception of Malawi, the countries with price controls adjust prices monthly. Malawi has a
price stabilization fund and has no pre-set automatic adjustment frequency. The stabilization
fund ran up a large deficit in 2008 (Kojima and Masami, 2009). They also posits that removal of
price controls, foreign exchange controls and introduction of investment incentives have,
however, not resulted in major changes in the overall economy. In particular, they have not
improved the manufacturing performance. Therefore, to build a self-sustaining industrial
sector, it is necessary to establish strategic linkages within the domestic economy.

Some efforts have to be made to promote strategic options among supply chains so as to enhance
spread effects of industrial growth and to facilitate transfer of technology, skills and growth of
small and medium scale sub-contractors. The linkages of the study variables in distribution
chain management in Nigeria are weak and because of this, there exists little inter-industry
integration in the country. This has resulted in consistently low manufacturing value added in
the sector (Kimani, 2013). According to Rong et al. (2009), when customers react not only to
price itself but changes in the price, some pricing strategies implemented by the supplier may
lead to reversed bullwhip effect. Where there is a central pricing authority like in price controls,
price change anticipations can result in supply shocks as every supply chain element seeks to
maximize on the price differentials. Under imperfect market conditions like in the oligopolistic
markets, collusions by the market players can set supply quotas that are preservative of desired
price levels. However price variations under perfect market conditions are a reflection of market
forces of demand and supply and reverse bull whip effect plays the causal role on pressure on
price.

Empirical studies abound in pricing of petroleum products. Wabwoba (2011) in a study on the
impact of oil price regulation on the financial performance of National oil companies in Kenya
(NOCK); it was observed that when the international crude oil prices were rising, oil marketing
companies quickly passed on these increased costs to consumers but took long to pass on cost
reduction benefits to consumers when international oil prices were on a downward spiral. Hence
the government through its agency the ERC (Energy Regulatory Commission) came up with a
way of regulating the fuel prices by setting the maximum prices which the oil marketers are to
charge. The ERC in addition developed a concept paper enumerating the petroleum supply
chain logistics and their cost implications on downstream retail prices (Wabwoba, 2011).
Storage capacity, which exists at every point in the supply chain, is important because stocks can
be used to help reduce the magnitude of sharp price spikes due to physical disruptions to supply
(Bacon, 2001). Such protection against supply shortages may be particularly important for
landlocked countries like Nigeria. Storage capacity is expensive to build and holding stocks
within this capacity also incurs substantial additional financial costs which are transferred to
end users (customers). As a result, companies hold contingency stocks to avoid stock-outs but
use just-in-time inventory management just as in any other business; they strive to optimize
their capacity with other links in their supply-and-delivery chain. Maximum cost efficiency is
achieved when this optimization is achieved and contingency stock levels are the result of a
careful risk assessment. The optimal level is situation-specific with no typical standard.
Business Daily (2009) noted that the petroleum product pricing and regulatory agency (PPRRA) in line with its mandate has drafted regulations to control pump prices. The Energy Act requires all proposed regulations to be recommended by the PPRRA to the Minister for Energy after consultations with the public. Although the National Energy Policy of 2004 states clearly that government will let market forces determine prices, during the Parliamentary readings of the Energy Bill a last minute clause was inserted in section 102 giving the Minister for Energy power to make regulations determining the retail prices of petroleum and petroleum products. Accordingly, the PPRRA in line with its function of protecting consumer and stakeholder interests has recommended regulations that will control pump prices. The regulations propose a formula for pump prices which incorporates the crude or refined product prices, freight, local transportation costs, financing, insurance, the refinery processing fees, taxes and a profit margin. The proposed pump price regulations have attracted resistance from oil marketers who would prefer to have the market forces and competition control pricing.

Open Tender System
In Nigeria, the government set up an Open Tender System (OTS) to import crude oil and petroleum products. Under the system, crude oil is purchased every month by NNPC for the entire market on the basis of a public tender, transported through one terminal, and shared among all marketing companies in proportion to their share of the market. Petroleum products are similarly purchased through the Open Tender System. Depending on supply and demand, the oil marketing companies may source the balance of their needs independently (Wabwoba, 2011). The Open Tender System is intended to have the dual benefit of ensuring competitive prices (which are made public) and transporting the oil in a way that would minimize evasion of the import duty (Chima, 2007). Each company is required to take the crude oil allocation and pay for the consignment within a specified time frame or risk penalties for late payment. In times of high oil prices, some marketers could not pay on time for imports, and their late payments delayed subsequent crude shipments, lowered refinery throughout, and caused fuel shortages with affect the end users. Nigeria imports enough petroleum products to accommodate three separate tenders a month, opening up the possibility of options other than the current Open Tender System where the right to import is granted to only one company (Kojima & Masami, 2009).

Owour (2007) noted that the importation of crude and refined product is undertaken through the open tender system which is a procurement system that requires an oil marketer to bid for the supply requirements for the entire market. For an oil company to participate in the open tender system it must be licensed and meet the conditions set by the department of petroleum resources (DPR). The successful bidder then imports and sells the product to the other oil companies as per their share of the market. The quality and quantity of products and their pricing is closely monitored by the Ministry of Energy via petroleum product pricing and regulatory authority (PPRRA). The importation of petroleum products through the open tender system is regulated by section 31A of the Petroleum Rules, Legal notice No. 197 of 2003 and the tender terms and conditions for the delivery of crude oil into Nigeria.

The open tender system ensures supply of product. It also ensures that products are imported at the lowest bid price and that the price is not subjected to fluctuating international market prices.
so as to ensure that the cost price for customer is at the lowest (Kojima and Masami, 2009). Owuor (2007) noted that from January 1, 2004, the government introduced a process in which all crude oil imported through Open Tender System (OTS) is coordinated by the Ministry of Energy on behalf of all the companies licensed to import petroleum products. Njoroge (2007) found out that OTS helps oil companies obtain bulk of their imports at more or less the same cost and therefore opportunity to gain competitive advantage through low costs is generally limited to product storage and distribution activities. Njoroge (2007) also noted that Petroleum products consumed in Nigeria are imported either as crude oil or as refined products.

CONCLUSION
From the foregoing discourse, it is clear that Oil will continue to be the major revenue earner of the economy for the foreseeable future. Although the President Buhari administration is attempting efforts at diversification of the economy to other sectors to shore up revenue, it will definitely take a long time to succeed if it is pursued with zest. Before the full deregulation of the downstream sector in mid 2016 the federal government policy on crude was targeted at local production and augmentation through import. Crude is refined to meet 70% of the country's requirements (NNPC, 2010). The balance 30% of the demand is met by importation of refined products. Of this quantity of refined products, 70% is imported through a product tender system coordinated by the Ministry of Energy, while the oil companies can import the remaining requirement on their own. The OTS is no doubt complex. As has been discussed, it requires oil marketers compete to import crude and refined products for the whole industry. The winner imports the monthly oil requirements and sells to other marketers at an agreed price. The import is in some instances guaranteed by financiers under a Collateral Financing Agreement (CFA).

The PPPRA introduced the CFA arrangement in 2004, it was geared towards creating a string of support activities to broaden participation by other institutions, i.e. the banks and distribution agents in the economy. To facilitate this policy, oil marketing companies use their stock within transport and storage system as security in order to secure financing. Under the scheme, banks issue Letters of Credit committing themselves to pay 80% of the total cost of the oil imported. In turn, an oil importer signs an agreement stating that oil within the system can only be released with the authority and instructions of the financiers of the consignment. Oil marketers would only have access to their share of the imported oil on the written authorization of the financiers after they have paid for their entitlement. This helped minimize the level of scarcity of petroleum product by readily making available products for end users (customers).

Even with full deregulation and removal of payment of subsidy on crude to major marketers, the price of petroleum products more than ever before is out of reach of common man (for domestic use); and has dealt a heavy blow on the cost of operations of many firms across the country. With no policy in place to build refineries and wipe out crude imports in the foreseeable future, Nigerians are groaning under the weight of high cost of energy. The challenge now is tilted more on the consumption side of the equation and is imparting negatively on the people. The Nigerian economy is on the verge of total collapse with unbearable inflation induced by products price increase and low crude revenue in the international market. The CBN in August 2016 declared that the Nigerian economy has entered into recession and urges the federal government to do more to stimulate it to avoid sliding into depression.
RECOMMENDATIONS

Building of modern refineries: A clarion can that need to be re-echoed is the dire imperative of building modern refineries that will enable domestic production of crude and its catalyzed derivatives to be available for domestic consumption. This will eliminate importation of products, cut down domestic prices and put less pressure on demand for the US dollars for import of Oil. This will help revamp the economy from the current recession and weakening naira to dollar ratio.

Tackling militancy in the Niger Delta: Although not a challenge discussed much in this study, it nonetheless posses a formidable constraint on the sector. Irrespective of the dire quest for development in the Niger Delta, militants should abhor violence. This adds to environmental degradation and threat to communal dwellers. The government of the day must evolve a strategic development template for the region to eliminate restiveness and militant groups. They must evolve a peaceful and sincere means to resolve the crises that has occasioned pipeline and flow station sabotage and resultant environmental hazards. Currently, over 3 million barrels of crude is lost per day as a result of flow station destruction. If curtailed, crude theft via pipeline siphoning, so-called illegal refinery destruction and the like will be eliminated to ease tension and other challenges in the sector.

Improving transparency in the Oil sector: Much of what people know about the challenges in the Nigerian oil industry is limited to the information from national dailies. The level of graft and subterfuge are yet to the determined. Transparency deficit and lack of conformance to extant rules have occasioned much corrupt practices. Products are not only being diverted, understated, and demurrage overstated, NNPC and the Nigerian government has no clue of how much barrels of crude per day the multinational oil firms are actually taking from the region. This is a challenge not only for the economy but for the mechanics of operating the sector.

Diversification of the economy: The federal government needs to carry out an urgent economic diversification. Because all eyes are on the petroleum sector, other sectors that can sufficiently balance the economy from shocks have been neglected. The recession we are passing through now in 2016 in Q1, Q2 and Q3 occasioned by falling crude price in the international market is an attestation to over-reliance on oil. If the mechanics for regulating the sector are well implemented, efficiency will result. If petroleum is less emphasized and other sectors of the economy are well and bubbling, the corruption in the bidding system, distribution and the sharp practices of NNPC officials along with connivance of regulating agencies with major and minor marketers will ebb considerable. It will lead to better efficiency not only in the oil industry but in the rest sectors of the economy.

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