

Marketing Nigerian light and sweet crudes in a world increasingly geared towards heavier and more sour crudes.

**Bachelor Project submitted for the obtention of the
Bachelor of Science HES in International Business Management**

by

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Declaration

This Bachelor Project is submitted as part of the final examination requirements of the Haute Ecole de Gestion de Genève, for the Bachelor of Science HES-SO in International Business Management.

The student accepts the terms of the confidentiality agreement if one has been signed. The use of any conclusions or recommendations made in the Bachelor Project, with no prejudice to their value, engages neither the responsibility of the author, nor the adviser to the Bachelor Project, nor the jury members nor the HEG.

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Tanya Kedisha COLE

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Executive Summary

The Nigerian crude Oil Market has been facing difficulties in Marketing their light and sweet crudes on a global scale.

These difficulties are the consequences of changes in trend in the Oil Market Industry, such as changes in the global oil refining landscape, highly increase competition from one of its key exporting partner and with the increase in demand shifting to the Middle East and Asia, with the assumption that the world is increasingly geared towards heavier and more sour crudes.

The research paper will define and examine the different characteristics of crude oil grades, it will enable the reader to understand what is meant by “light and sweet “and “heavy and sour” crudes and where such crudes are situated.

In addition, the research paper will examine the Nigerian Oil Industry and the World Oil Industry, in order to demonstrate the importance of such industry and the necessity of marketing one’s product.

My objective was to demonstrate that the new trend “global structural transforming trend” in the oil refining market had no significant impact on the Marketing of Nigerian light and sweet crude oils.

On the other hand, the real significant impact on the Marketing of Nigerian light and sweet crude oils, is the Management style of the Nigerian National Petroleum Corporation (NNPC), the lack of information that is provided from the latter, the lack of infrastructure in Niger Delta area, the disruption in their crude oil supply and the decrease in Nigeria’s Foreign Direct Investment (FDI) have dramatically caused distress in the Nigerian Oil Market.

Concerning external challenges, the American Shale Boom has impacted the crude exportation to the USA and this Revolution has caused not only distress in the Nigeria Market but globally, with fallen crude oil prices and the conquer for market share among producers.

In conclusion, reasonable evidence has proven that the market is not indeed at this instance geared towards “heavier and more sour crudes”. On the contrary, the findings had illustrated that the Oil Market Industry is quite oversupplied with “light and sweet crudes”, thus beneficial for refiners, but not for the Nigerian Oil Industry.

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1. Introduction

The Nigerian crude oil market has been facing difficulties in Marketing their light and sweet crudes on a global scale, since there have been different trends in the Market such as changes in the global oil refining landscape, highly increase competition from one of its key exporting partner and with the increase in demand shifting to the Middle East and Asia, with the assumption that the world is increasingly geared towards heavier and more sour crudes.

Over the past few years, the number of refineries has decreased, mostly the simple refineries or refineries that was not invested in. On the other hand, the capacity of the surviving ones continues to grow; the increase of their efficiency, will help them remain competitive and more profitable.

Refineries process crude oils which have different types of hydrocarbons with carbon chains of different length into a broad range of refined products, and this process removes sulfur, nitrogen and metals.

Furthermore, the sulfur content determines the grades of the crudes and their prices; light, sweet crudes have a higher proportion of the light molecules used to make premium fuels like gasoline, naphtha, and may also, to some extent produce diesel, which is easier to be refined and requires a simple refinery. And heavy crudes have a higher proportion of molecules that can only be used to make diesel fuel or residual fuels oils that are sold at a discount. To add, heavy crudes are also more difficult to refine, requiring intensive processing by using catalytic cracking and coking units.

Due to the changing patterns in fuel demand regarding the Asian market (increase in demand in diesel), refineries had adjusted their product slate to meet these changes and thus seeking to be more profitable. To add, the oil refining, business, is a very capital-intensive business, it takes 5-7 years to construct and cost around \$7 to \$10 billion, which may varies depending on the location, type of crude to be processed and the range of outputs.

As a consequence of the high cost, refineries have invested in the past few years in more complex refineries to refine more heavy crudes since they can buy it cheaper than the premium light crudes. With the heavy crudes, the acquisition cost is less (bought at a lower price than the premium light crude – refiners are price takers thus at the market price), high utilization rate thus they will be more operational efficient, thus more profitability.

1.1 Need for research

A research was necessary for this topic, because the Nigeria Market has been in distress over the couple of years.

1.2 Issue definition

Over the past few years, North America domestic crude production has significantly increased, hence putting pressure on the import of the Nigeria crude in the country, through 2011 and 2014: North America demand for crude fell by 1.2 mb/d, due to the increase of the domestic production.

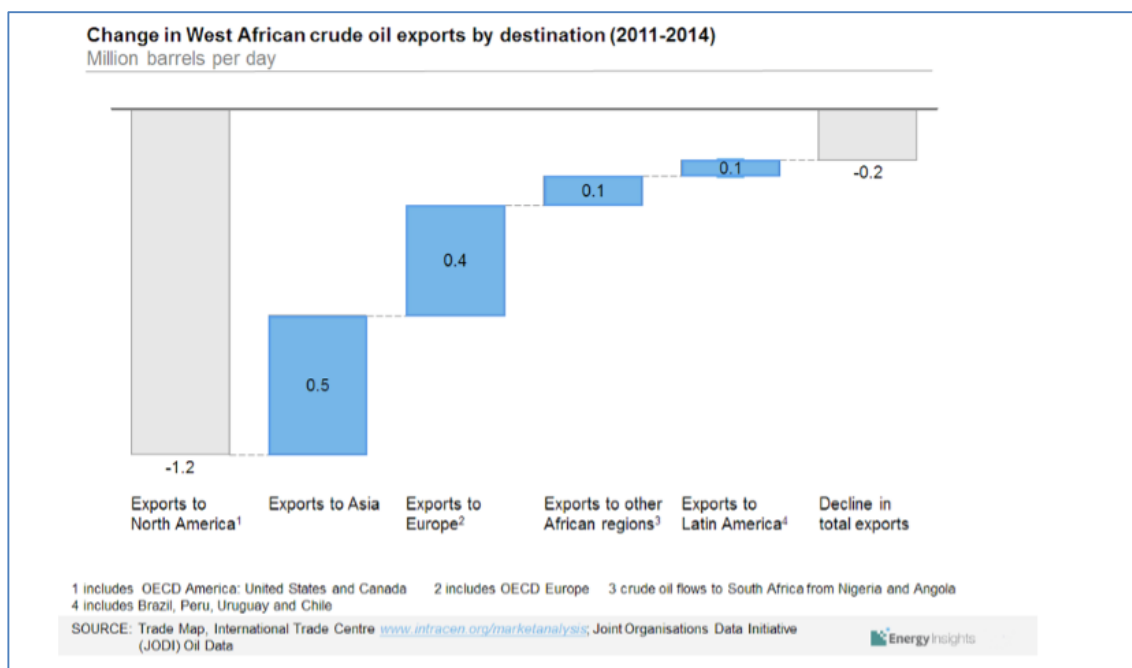
The Nigerians hope to shift their market to the East, but unfortunately demand in Asia was very modest. Therefore, the market had to redirect its output towards Europe and elsewhere.

Within the same time period, the production of West African crude fell by 0.3mb/d, with majority of the decline attributable to Nigeria, due to sabotage on their infrastructure and oil theft. The lack of new investments due to uncertainty in regulatory system.

Nigeria had hit rock bottom with all these commodity curse.

The below explains perfectly the situation explained above.

Figure 1 – Change in the WAF crude oil exports by destination (2011-2014)



Source: McKinsey & Company, 2015.

1.3 Research question and hypothesis

Topic: Marketing Nigerian light and sweet crudes in a world increasingly geared towards heavier and more sour crudes.

Question: Is the demand growth of heavier and more sour crudes distressing the Marketing of Nigerian light and sweet crudes?

Hypothesis 0: “The Nigerian light and sweet crudes are in distress since the market is moving towards heavy and sour crudes. “

Hypothesis 1: “The Nigerian light and sweet crudes are not in distress because the market is moving towards heavy and sour crudes.”

1.4 Scope of the work

The objectives of this paper is to look at the issues involving the refineries and the Nigerian light crude oil. Firstly, I will define the characteristic of the Nigerian oil production, mainly focusing on their light and sweet crude grades, then I will expose the global trend development of refineries, especially the technical development aspect and the effect on the trade of the light and sweet crude grades. So with this in mind, I will ask the following question, “what strategies or what is the best strategy should Nigerian producers undertake or adapt, in order to remain competitive in this changing refining technique market?”

However, with the documents read, the marketing of the Nigerian light and sweet crudes have become difficult due to the complexity of the refineries, but also, because of the American Shale Oil boom (MAUGERI, 2013, p.25); the unconventional and tight light oil has displaced the imports of the West African imports, especially the Nigerian light and sweet crudes. So therefore, I will develop the changes in the American marketing, relating to pushing towards energy dependency. Then I will ask the question, “is it correct to state that the American Shale Oil boom is one of the major factor that had impact the marketing of the Nigerian light and sweet crude? “

Additionally, my main objective is to illustrate, “how trading companies that trade Nigerian crudes will be impacted, will they lose or will the gain?”

To finish, the principal question to be asked is, does the main questions above regarding the refinery and the American Shale Oil boom form one problem: “To whom Nigeria should sell its production?”

1.5 Research Methodology

Within this section, I will illustrate how I will analyze the objectives stated above. To accomplish the given objectives, I conducted this research by using both quantitative and qualitative data. The resources that were used are primary and secondary researches, that will assist me in the development of my project.

Qualitative information was collected from the Nigerian National Petroleum Corporation (NNPC) website, that cited information about the historical background of their crudes. Also, quantitative information was gathered through, companies' annual reports, brochures and trading corporate websites, reports from consulting firms such as McKinsey & Company – Energy insight reports and from Genscape online websites, that provides energy market data reports.

Furthermore, press articles were consulted continuously because of the volatility of the energy market and its uncertainty of the future. Therefore, I collected data from the online sites such as The Financial Times, Thomson Reuters and Bloomberg.

To finish, an opportunity was given to interview a trader of Nigerian crudes, the interview was held in a trading hub in Geneva - State Oil Company of Azerbaijan Republic (SOCAR).

1.6 Organization of the thesis

The thesis was organized in the following stricture:

- 1) Analysis of the characteristics of the grades of crude oil, how these are measured and classified and how prices are fixed according to these characteristics.
- 2) Overall study of the Nigerian crude oil market, its historical background, its membership in the OPEC (*Organization of the Petroleum Exporting Countries*) and its trade flows over the recent years.
- 3) Analysis of the global crude oil trends in the market, relating to refineries.
- 4) Analysis of the characteristics of a refinery, how its capacity performance is measured and calculated.
- 5) Analysis of the results of the interviews, which will be based on the impact of the changes in the Nigerian crude oil market on the trading hubs in Geneva.

- 6) Discussion that will developed in my opinions, concerning the marketing of the Nigerian crudes, especially their light crudes.

1.7 Literature Review

According to different Mckinsey & Company Energy insights report¹ read, they stated, external market shifts are not new to the downstream oil & gas industry. That changes in environmental regulations, fluctuating natural gas prices, and the recent sharp decline in crude oil prices have caused ripple effects for downstream players. These external shifts can generate major new opportunities for refiners, but require them to be nimble and proactive as they re-optimize to the '*new normal*'.² They stated as markets shift, so do refiner's incentives.

Over the last 10 years, market shifts altering incentives occurred in the US gasoline and distillate markets. These markets traditionally were well balanced with gasoline and diesel pricing relatively similarly, with only seasonal swings toward one or the other being at a premium. However, in the last 5 years, the market has seen a structural shift, with diesel now significantly and consistently out-pricing gasoline.

These changes are part of a global shift in the gasoline and diesel balance that has been driven by several factors:

- **The first factor is the accelerating diesel demand growth in developing markets**

As global oil demand growth has shifted to developing economies (in Asia and Latin America) this has biased growth toward distillates. Developing economies have a higher share of commercial (trucking demand), which tends to bias demand and demand growth toward diesel.

- **The second factor is decreasing gasoline demand in developed markets**

In developed markets demand has been declining in the light-duty passenger sector due to increasing vehicle efficiency (largely driven by tightening fuel efficient regulation) and growing penetration of alternative fuels. These trends have disproportionately hit gasoline demand since it is traditionally favored in the light duty vehicle sector.

¹ http://www.mckinsey.com/client_service/oil_and_gas/latest_thinking

² Definition : business or new standards

As a consequence of this structural shift, refineries focus year-round on optimizing for diesel and jet fuel production at the expense of gasoline and naphtha. Additionally, capital projects that capitalize on this price spread, which may not have made sense 5-10 years ago, could be highly profitable in this new distillate market.

2. Crude oil Analysis

2.1 Introduction

According to the oil price's editorial department³, crude oil is a liquid that is found within the Earth, it is composed of 50%-97% of hydrocarbons, 6%-10% of organic compounds, such as nitrogen, oxygen, and sulfur, and at least 1% of metals such as copper, nickel, vanadium and iron. Moreover, crude oil is formed through the heating and compression of organic materials; and it is extracted from drilling and oil sands (strip mining).

Crude oil is a vital commodity for the world economy and for our daily life. It is used to make plastic, non-flammable clothing, furniture, insulation, kitchen items, cars and their accessories, food, production in general and transportation. Products derived from crude oil supply 33% of the world's energy need. In comparison natural gas and coal supply account for 22% and 26% respectively⁴. Overall the economy can be either adversely affected by increasing oil prices or can benefit with decreasing oil prices.

In 1789, Crude oil was first discovered and developed during the industrial revolution as a consequence, newly invented machines.

2.1.1 Definition and characteristics of crude oil

Crude oil can be defined as “unrefined petroleum” or “black gold”, since it has ranging viscosity and varies in different color shades of black and yellow, with accordance with its hydrocarbon composition.

All crude oils have different characteristics and they are factors to take into consideration when setting the price of the crudes. In order to set the price, crude oils are classified based on their viscosity; the degree of viscosity is quite essential to determine how crude oil will be stored and transported, thus the cost of carry will be primarily influenced by this variable⁵. Therefore, petroleum industry classify crudes based on their geographical region, but also by the density of the unrefined petroleum and the percentage of sulfur content present in the crude oil, since in the same area the crudes may differ.

³ <http://oilprice.com/Energy/Crude-Oil/What-Is-Crude-Oil-A-Detailed-Explanation-On-This-Essential-Fossil-Fuel.html>

⁴ <http://www.api.org/~media/Files/Oil-and-Natural-Gas/Crude-Oil-Product-Markets/Crude-Oil-Primer/Understanding-Crude-Oil-and-Product-Markets-Primer-High.pdf>

⁵ <http://hypervolatility.com/macroeconomics/oil-fundamentals-crude-oil-grades-and-refining-process/>

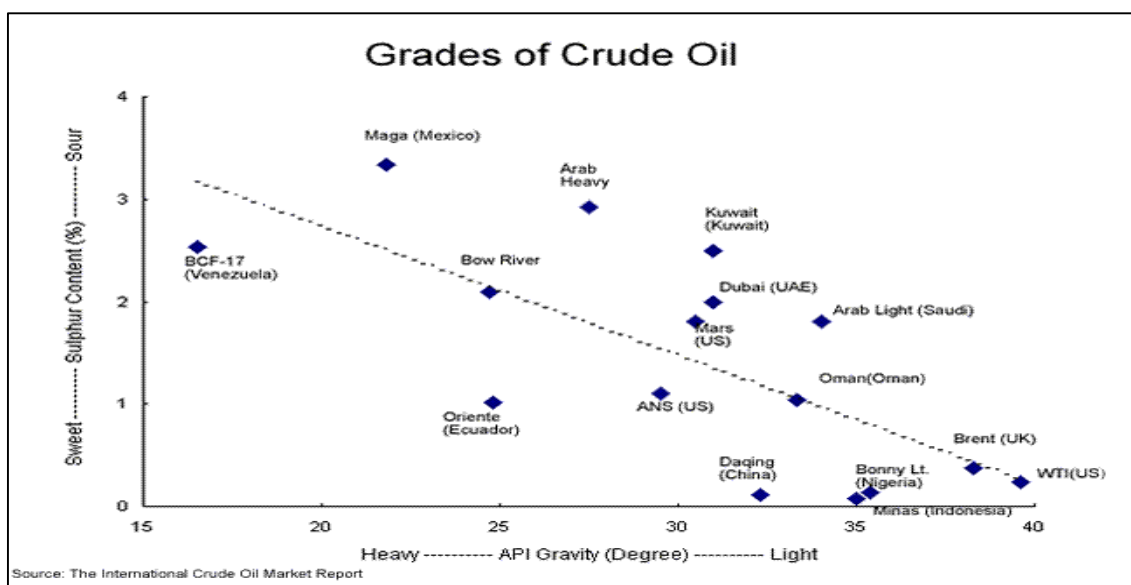
The sulfur measures the pureness of the crude oils; in other words, the level of impurity is measured to determine if the crude oils are considered as “sweet” or “sour”. To be considered as “sweet”, the crude oil must contain less than 0.5% of sulfur. Due to its corrosive effect, sweet crude oils are easier to refine, safer to extract and to transport which means that they are sold at a higher price. On the contrary, to be considered as “sour”, the crude oil must contain more than 0.5% of sulfur, means that the crude contains a high level of impurity that needs to be removed, thus, the refining process will be less simple.

The density of raw petroleum is called the American Petroleum Institute (API) gravity. The gravity ratio compares the density of oil to that of water; crudes can be classified as “light”, “medium”, “heavy”, or “extra heavy”. The value of the petroleum is directly determined by its API gravity. However, it is not the only variable that influences the price.

A “light” oil it is preferable because there is a greater quantity of hydrocarbons that can be converted into gasoline and as it is characterized by a light viscosity, it needs less processing at the refinery. On the contrary, when the oil is considered as “heavy”, it will need more processing in order to eliminate all impurities, thus this process will be costlier, as it requires more work.

On the other hand, for a buyer/refiner a “heavy” and “sour” crude oil will cost less than a “light” and “sweet” crude oil, as this latter will be easier to refine and since heavy crudes produces a minor quality of commercial product after refining.

Figure 2 – Classification of Crude Oil



Source: HyperVolatility, 2013.

The above figure illustrates the classification of different crude oils according to their API gravity in degree and sulfur content in percentage. As seen on the graph, the European Brent and American West Texas Intermediate are relatively close to X-axis and both have a high degree of API and an extremely low level of sulfur content (>0.5%), which means that both are light and sweet (low level of impurity) types of crude oils. Hence, both crudes are more profitable in terms of commercial value and less work is needed and the refining process is faster, hence these crudes are used on an international scale as benchmarks in order to fix the price for other crudes.

2.1.2 Analysis of the crude oil benchmarks

There are different types of crudes that exist worldwide. What makes the difference are as mentioned above their grades and the crudes attractiveness are their regions where they are from, this mainly based on a transportation advantage, if crude oils are waterborne most buyers see this as an advantage, as this is less costly.

Since there are a lot of nuances and different characteristics to defined the crude, benchmarks were introduced in order to make the commodity valued more easily, so that traders may have a great knowledge about where the crudes are located and its quality.

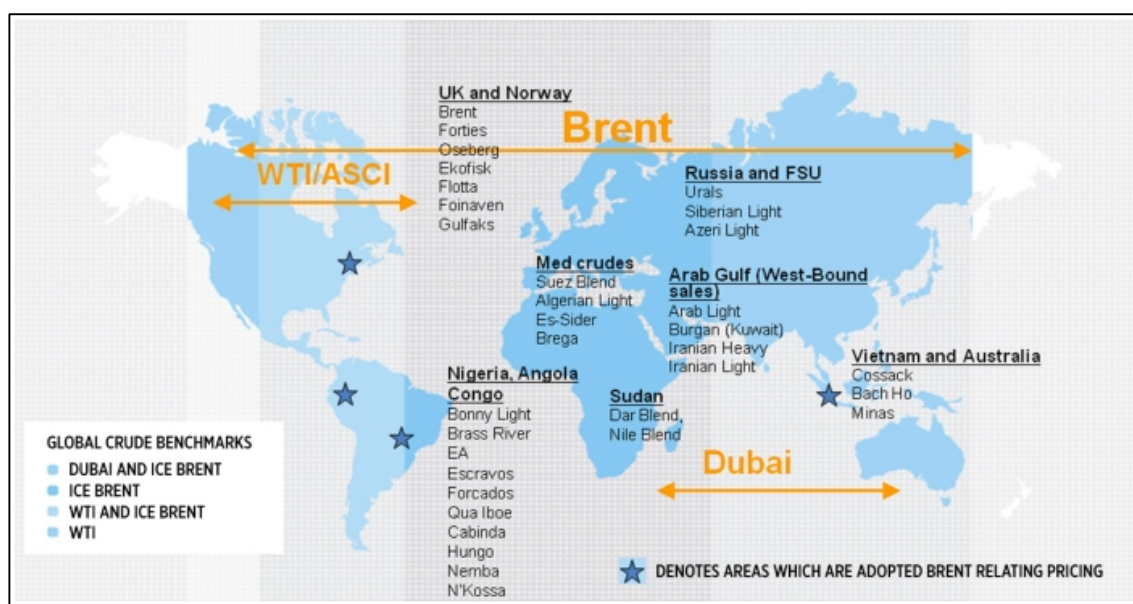
The most commonly used benchmarks are Brent, West Texas Intermediate and Dubai/Oman. These three benchmarks are widely used, since they have stable and ample production; transparent, free-flowing market located in a geopolitically and

financially stable region to encourage market interactions; adequate storage to encourage market development; and/or delivery points at locations suitable for trade with other market hubs, enabling arbitrage (profit opportunities) so that prices reflect global supply and demand (Investopedia, 2015).

Furthermore, when the price of crude oil is discussed by energy analysts, they often refer to a frequently bought and sold specific types of crude oil, such as Brent or WTI. Benchmarks are quite essential as it simplifies the pricing of variety of crudes, which are produced around the world.

Finally, different types of crudes are compared to the benchmarks mentioned above by an agreed-upon differential; this latter may take into account the quality of crude based on their density (API gravity) or sulfur content, the cost of transporting the unrefined crudes to refineries, and regional and global supply and demand conditions, including refinery utilization (Investopedia, 2015).

Figure 3 – Global Crude Oil Benchmarks



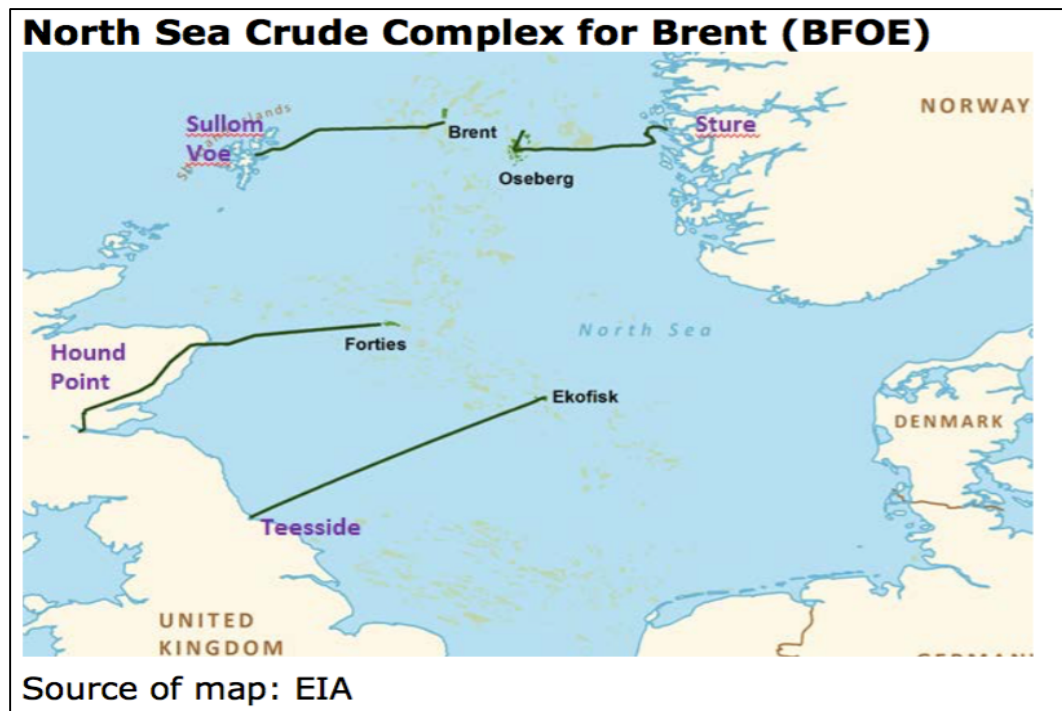
Source: Intercontinental Exchange (ICE), 2016.

The above figure illustrates the different areas that adopt a specific benchmark, and as shown on the figure, ICE Brent, “the light and sweet crude” is the most frequently used benchmark worldwide, and crude oils are priced based on the Brent price fluctuations.

2.1.2.1 ICE Brent Benchmark

ICE Brent is a waterborne crude oil market, as shown on the figure below, Brent is located in the United Kingdom sector of the North Sea and is delivered by pipeline to the terminal at Sullom Voe. Brent is consisting of four oil streams that are traded independently in the physical market, which are Oseking, Brent, Forties, and Ekofisk.

Figure 4 – ICE Brent Benchmark Markup



Source: EIA, 2016.

Moreover, Brent makes up two-thirds of crude contracts around the world, the Brent Blend is the most widely used marker: it is the leading global benchmark for the Atlantic Basin crude oils and low-sulfur crudes, this includes grades that are produced from Nigeria and Angola, US Gulf Coast sweet crudes oils, Louisiana Light Sweet (LLS) and US benchmark, West Texas Intermediate (WTI).

Most crudes are traded as a basis to Brent, actually to Dated Brent: meaning that a cargo loaded within the next ten - twenty-one days, will be traded on a Futures/Swap Market or Contract for differences (CFDs) on a BFOE basis. Even though, Dated Brent is not an actual spot market, but rather a short-term forward market affected by CDFs; its basis is used to price approximately 65% of the world's trade in crude oil and deals done for immediate delivery. Just to finish, Brent is quite an important markup since it is used to manage price risk in the global oil market.

2.1.2.2 West Texas Intermediate Benchmark

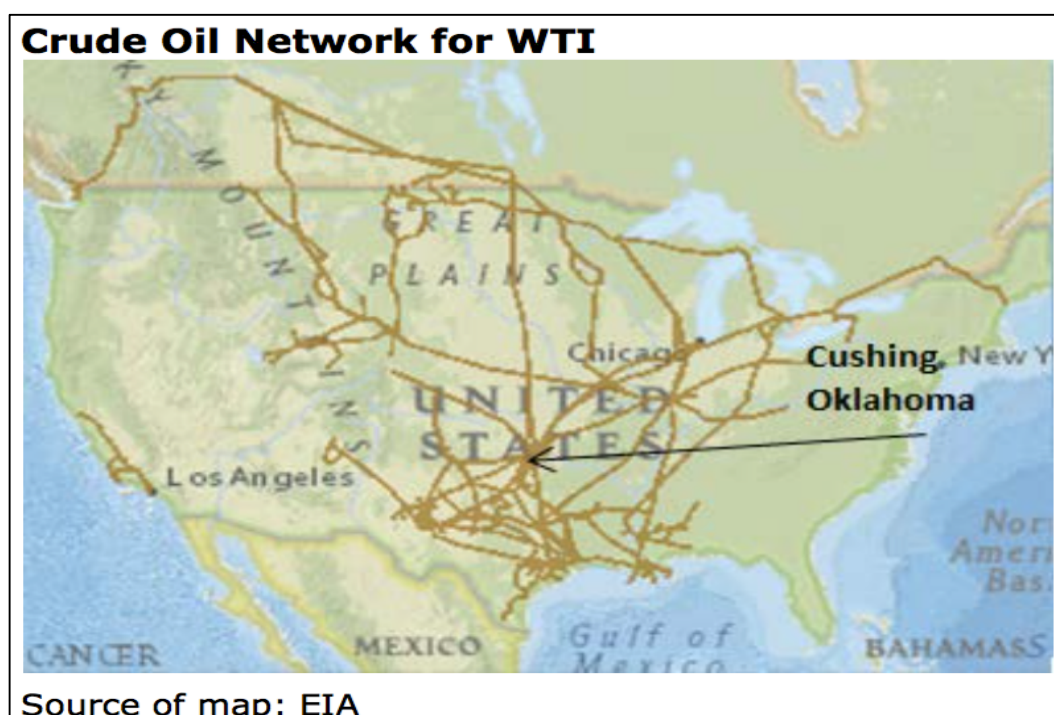
West Texas Intermediate is known as the most liquid crude oil benchmark (CME, 2012). It is a mid-continent pipeline market where crude oil flows continuously at near constant rates. The network of pipelines and storage tanks at Cushing, Oklahoma in the United States of America, made West Texas Intermediate a natural marker price for the United States pipeline crude.

WTI is a blend of several United States domestic streams of light sweet crude oil. Its delivery point is at Cushing, and it is a transshipment point where storage facilities and intersecting pipelines provide easy access to refiners and suppliers.

The light sweet crude oil (WTI) is a significant physical market price reference and serves as a benchmark for around ten million barrels of daily North American production and has become the most efficient hedging tool for hundreds of commercial oil companies.

Furthermore, the WTI futures and options are the world's most actively traded energy contracts. It used for price discovery for more than twenty-five years (CME Group, 2012). Traditionally, WTI is traded at a small premium to Brent.

Figure 5 – Crude Oil Network for WTI



Source: EIA, 2016.

2.1.2.3 Importance of future market

Before the late 1970s, the spot market was commonly used, a buyer would buy a specific crude at a specific price and accept its delivery within a small amount of time. As a consequence of the oil crisis in 70's, all the players in the market looked for solution in order to minimize the risk of a sudden price increase.

Since then, the commodity market trades mostly through the futures market and thus each futures contract are tied to a specific category of oil. And most crudes are traded on the futures market because the majority of the crudes bought are not actually physically delivered. With such instrument buyers of the crude oil may lock in the price of the crude for couple of months.

The three mainly used futures contracts are Brent Future, which are available on ICE Futures Europe, WTI contracts which are sold chiefly on the New York Mercantile Exchange, or NYMEX and lastly, the Oman Crude Oil Futures Contract (DME Oman) has been marketed on the Dubai Mercantile Exchange since 2007. These contracts stipulate not only where the oil is drilled, but also its quality (Investopedia, 2015).

3. Nigerian Crude Oil Market Analysis

Nigeria is known to have the largest petroleum industry on the African continent and the world's 26th largest economy. In 2014, surprisingly to know that the petroleum industry in Nigeria contributes only to around 14% to its economy (Viljoen, 2014). Even though, this sector is quite essential, it remains in fact a small part of the country's overall diversified economy. The oil and gas sector accounts for about 35 per cent of gross domestic product, and petroleum exports revenue represents over 90 per cent of total exports revenue (OPEC, 2016) and this dominant role has pushed agriculture, the traditional mainstay of the economy, from the early fifties and sixties, to the background.

The crude oil market is the source of energy and foreign exchange for the Nigerian economy: crude oil consumption and export have contributed to the improvement of the Nigerian economy. The oil mainstay (pillar) of the Nigerian economy plays a vital role in shaping the economic and political destiny of the country.

3.1 Brief Historical Background

In 1956, crude oil was discovered by Shell-BP in Nigeria at Oligibiri in the Niger Delta. In the next two years, Nigeria made the ranking of oil producer with its first oil field that produced 5,100 barrels per day. Prior 1960, *exploration rights in onshore and offshore areas adjoining the Niger Delta were extended to other foreign companies* (NNPC, 2016). And in 1965 the EA field was discovered by Shell in shallow water southeast of Warri (NNPC, 2016).

At the end of the Nigerian Civil War (1967-1970), the oil industry began to play a prominent role in the economic life of the country, since crude oil prices had increased.

In 1971, the country joined the Organisation of Petroleum Exporting Countries (OPEC) and in 1977, the Nigerian National Petroleum Company⁶ which is a state owned and controlled company. NNPC⁷ is the major partner in the upstream joint ventures with the 'seven sisters' or major multinational petroleum exploration and production companies. (The NNPC owns an average 57 per cent in these JVS.)

⁶ Appendix 7: NNPC Operation

⁷ <https://web.archive.org/web/20060213013744/http://www.nigeriabusinessinfo.com/nigerian-oil.htm>

Since the discovery of the crude oil field, the petroleum industry has developed rapidly with a production level that varies between 2 million barrels of crude oil a day to around 4 million barrels of crude oil a day. Therefore, according to NNPC, Nigeria thereafter, attained the status of a major oil producer, ranking 7th in the world in 1972, and has since grown to become the sixth largest oil producing country in the world (NNPC, 2016).

3.2 Oil Reserves in Nigeria

A 2003 estimate showed recoverable crude oil reserves at 34 billion barrels. The reserve base is expected to increase due to additional exploration and appraisal drilling. Already, over 900 million barrels of crude oil of recoverable reserves have been identified. The government has also set a target to achieve a reserve of 40 billion barrels by 2010 (NNPC, 2016).

3.3 Oil Fields⁸

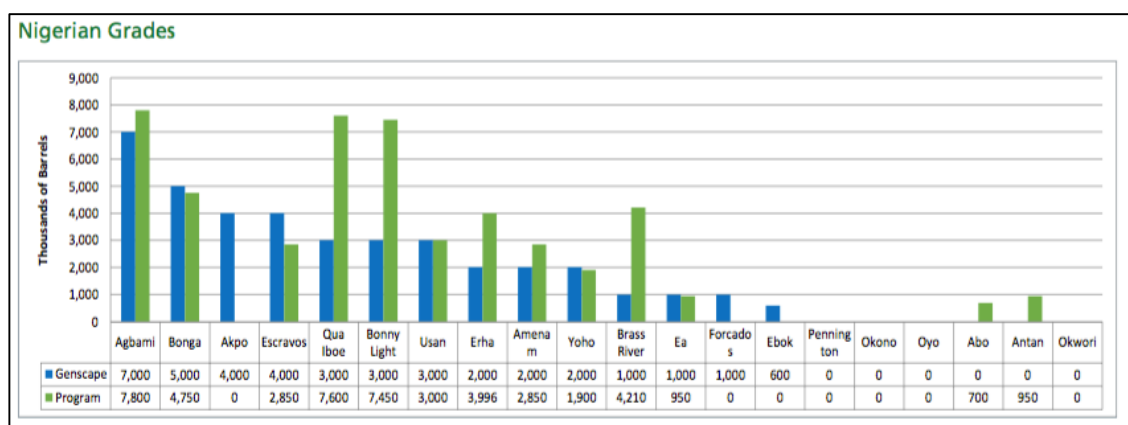
In total, there are around 606 oil fields in the Niger Delta area, of which 355 are on-shore while the rest are offshore. NNPC states that 193 are currently operational while 23 have been abandoned as a result of poor prospectivity or wells drying up. On the other hand, 28 exploratory oil wells that have been drilled outside of the Niger Delta, are showing various levels of prospectivity; these wells include two discovery wells in Anambra State, one discovery well each in Edo State and Benue State each and twenty-four wells in the Chad Basin. However, production is yet to commence from any of the wells (NNPC, 2016).

⁸ Appendix 6: Niger Delta

3.4 Nigeria Crude Oils

Nigeria accounts for around 22 different types crude oils, which could be classified as “sweet and light” crude oils.

Figure 6 – Nigerian Grades



Source: Genscape, 2016.

The following figure above shows the different grades from Nigeria, and its loading programs within the month of July 2016. We can see that the most demanded or loaded are Agbami (*API 47.9% & Sulfur 0.04%*, (Statoil, 2016), Qua iboe (*API 36.8% & Sulfur 0.1%*), (Exxon, 2016) and Bonny light (*API 35.3% & Sulfur 0.15%*), with loading programs 7’800 thousands of barrels, 7’600 thousands of barrels and 7’450 thousands of barrels consecutively.

Figure 7 – Observed loadings by region

Nigeria									
	Africa	East Asia	India Sub Con	Mediterranean	North America	NW Europe	South America	Australasia	Total
Qua Iboe		1.0	2.0			1.0			4.0
Agbami			2.0			1.0	4.0		7.0
Bonga	3.0			2.0		1.0			6.0
Bonny Light			1.0				2.0		3.0
Forcados	1.0								1.0
Erha	2.0					1.0			3.0
Escravos	1.0	1.0		2.0		1.0			5.0
Akpo				1.0	3.0				4.0
Brass River			1.0						1.0
Okono									
Ea			1.0						1.0
Yoho					2.0				2.0
Usan				2.0	1.0				3.0
Ebok				0.6					0.6
Amenam				2.0	1.0				3.0
Abo									
Antan									
Pennington									
Okwori				0.6					0.6
Oyo									
Ima									
Tulja			1						1
Grand Total	7.0	2.0	7.0	10.2	7.0	5.0	6.0		44.2

Source: Genscape, 2016.

The following figure above illustrates the observed loadings of barrels by regions (in thousands of barrels) for the month of July. We can see that the most demanded crude oil are light and medium and sweet crudes and the most demanded regions were Mediterranean 10.2 thousands of barrels, Africa, India and North America with a grand total of 7 thousands of barrels. Hence, we could conclude that Nigeria's main key exporter regions for the month of July are mainly the four regions cited above.

3.4.1 The Market Structure in Nigeria

Producers are not price maker in this industry. The price is fixed by the supply and demand. To illustrate that, we can see that the price of the barrel fell from around \$110 to \$50 in September 2015. It was due, in part, because some oil producing countries decided not to reduce the supply in order to keep competitive in the oil market, which led to an excessive supply compared to the actual demand.

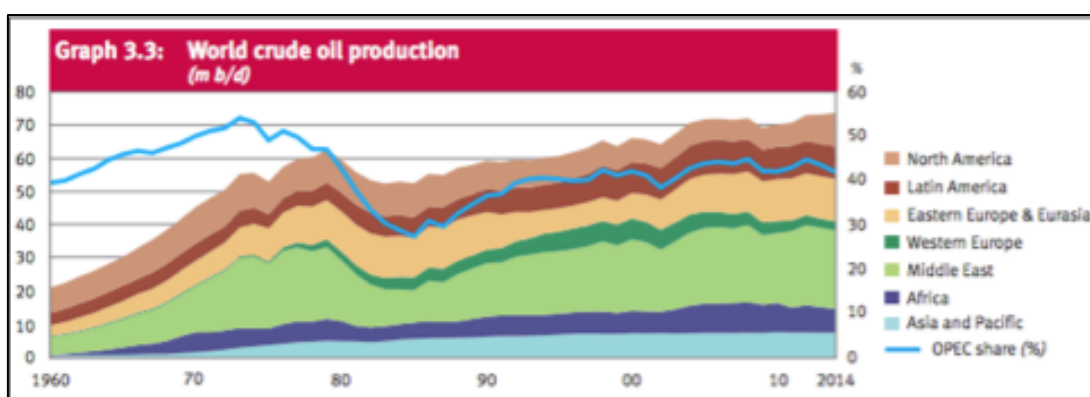
The Nigerian crude oil market is an oligopoly; only few players are in the market, due to high entry costs in the industry and the scarcity of the resource. For this reason, most of them are extremely influential firms, such as BP and Total. In Nigeria, they work in joint venture with the Government. For example, Bonny Light crudes are produced by a joint venture between Chevron, Shell and the Nigerian Government (NNPC – Nigerian National Petroleum Corporation).

In Nigeria, dozens of companies have a license to produce crude oil, although the biggest producers are Shell, AGIP, Chevron and Total. Only the important multinationals are the main players in the sector. Other firms also produce, but they do not have the same market shares (Cole, Gasser, Schnekel, 2015).

3.4.1.1 Competitors and key players "OPEC"

The below figure illustrates that crude oil is produced worldwide and that Nigerian producers compete with different producers from the African region, especially with Angola and with more significant regions such as the Middle East, Eastern Europe, mostly Russia and now, recently the United States of America.

Figure 8 – World crude oil production by region



Source: OPEC, Annual statistical bulletin, 2015.

In 1960, Iran, Iraq, Kuwait, Saudi Arabia and Venezuela created the Organization of the Petroleum Exporting Countries (OPEC) in order to coordinate and unify policy and to secure the price of crude oil. Few countries joined later the organization, such as Qatar, Nigeria, and Angola. The OPEC countries used to produce most of the oil production; but in 2004, they only generated around 45% of the world production (Cole, Gasser, Schnekel, 2015).

3.4.2 Opportunities and Challenges

A main challenge for Nigeria is its refineries capacity of production, which means that the countries have to export the crude oil they produce and then import refined oil at an additional cost. Moreover, instability, lack of infrastructures, infrastructures sabotages and corruption, lead to conflicts and impact refining capacity of Nigeria.

The biggest challenge in Nigeria, is the theft of their crude oil production in their Niger Delta Fields, groups such as the Avengers, have periled the exportation of the Nigerian crude oil, whilst making the marketing of the Nigerian crude oil difficult, as the production as lowered back in May 2016.

Opportunity can be found in the needs of importers. For instance, the interest from the Indian market for “sweet” and “light” crudes as it can be found in Nigeria. Another opportunity are the legislations for liberation of the sector which allows more investments⁹ (Cole, Gasser, Schnekel, 2015).

⁹ <https://www.youtube.com/watch?v=wcsuMGQiiYk>

In Africa, the main producers of crude oil in 2014 were Nigeria and Angola. According to OPEC, they were able to produce 1'807 thousands of barrels per day for Nigeria and 1'653,7 thousand for Angola, which represent 4.7% of total world production.

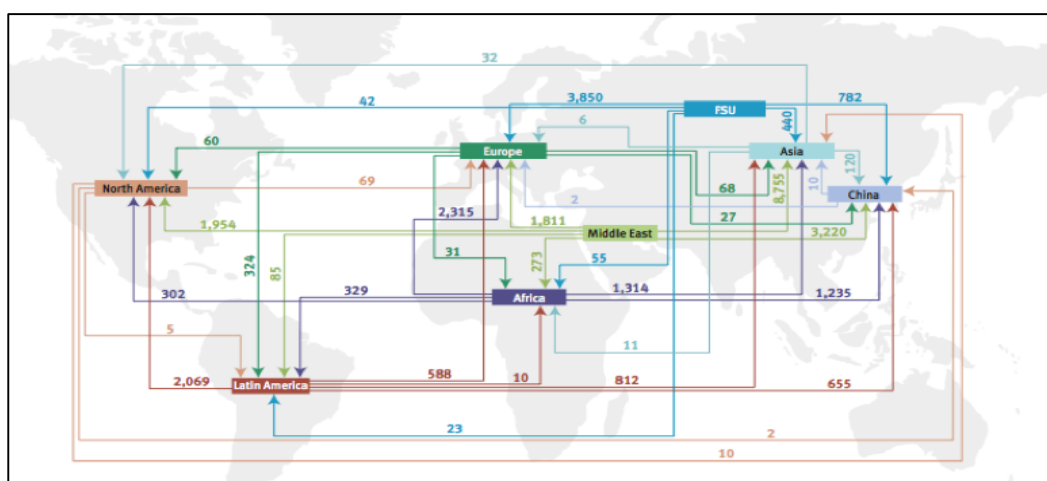
OPEC also observed that, Nigeria had respectively a proven reserve of crude oil of 37'070 and 8'423 million barrels, which represent 2.2% and 0.7% of share of total proven reserve. In comparison, the main producers of crude oil in Africa, Libya, had 2.8% of the total share and the major share was Venezuela with 17.5%. Overall, it can be observed that between 2010 and 2014, the proven reserve of these countries remained quite the same, without any considerable increase. The only country that registered an important rise in its reserve has been the USA with an increase of 56% (Cole, Gasser, Schneckel, 2015).

Furthermore, the main region importing African crudes were Europe, China, India, Latin America and finally the USA. All importing regions included, the trade represented 7.8% of the share of total export (BP, 2014).

USA imports of West African crudes decreased from 29.5% in 2011 to 7.7% in 2014 (OPEC, 2015). This is due to the growth in the crude oil sector in USA and is a good example of how the change in demand from an importing country can impact drastically the exports of its partner.

As for the refinery capacities, Africa uses only 64% of its capacity, meaning that they could improve their utilization. Based on OPEC statistics, Nigeria refinery capacity amounted 445 thousands of barrels per day and 39 thousand for Angola (Cole, Gasser, Schneckel, 2015).

Figure 9 – World Interregional trade of crude oil 2004 (1000 b/d)

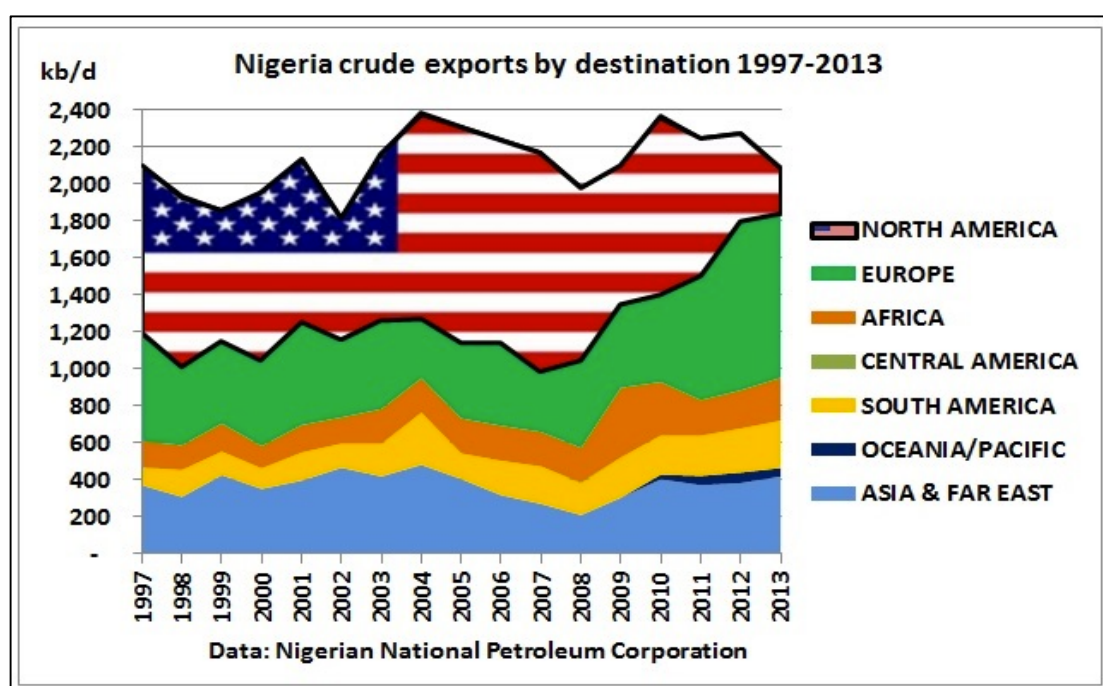


Source: OPEC, Annual statistical bulletin, 2015.

The illustration above shows the trade flow for Africa, including Nigeria, as mentioned before Europe is the number one destination for the African crude, and with the confirmation of Mr. Angel Martinez, Europe mostly imports crudes from Nigeria because of their refinery capacity and regulations.

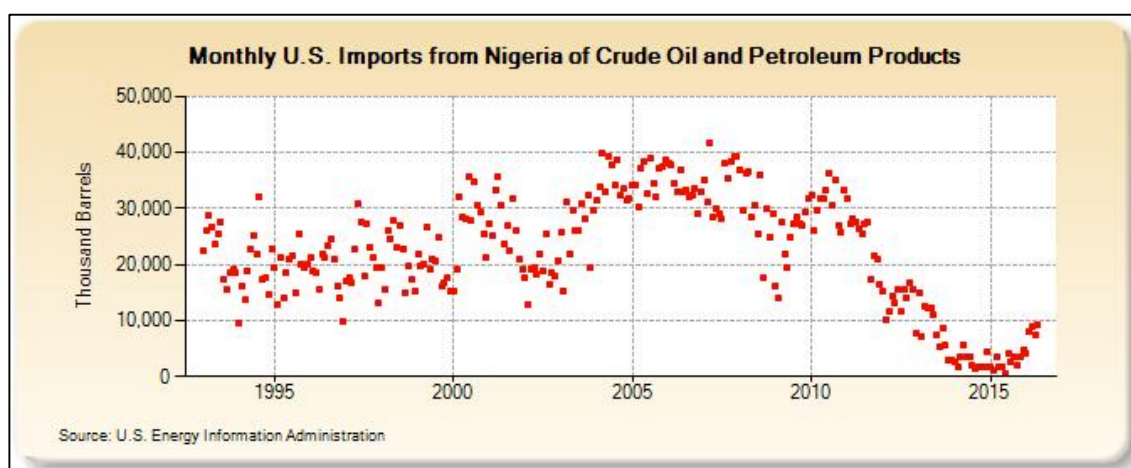
One of the Nigerian's main exporting region was the USA, between 1997 - 2003 as seen on the graphs, but since the American Shale Revolution the exportations towards the USA has dramatically decreased.

Figure 10 – Nigeria crude exports by destination 1997 – 2003



Source: NNPC, 2016.

Figure 11 – Monthly U.S. imports from Nigeria of Crude Oil



Source: U.S Energy Information Administration, 2016.

The above figures demonstrate the issue right now in the Nigerian crude oil market, the USA was one of the Nigeria key exporting regions, but since the American Shale Boom, the import of the Nigerian light and sweet crude oil has decreased in the USA.

As a consequence of this American Shale Revolution, the crude oil market has seen the oil price fallen, the supply of light crudes has risen and the Nigerian market has been struggling with trading their crude.

3.5 Nigerian Crude Oil Differentials

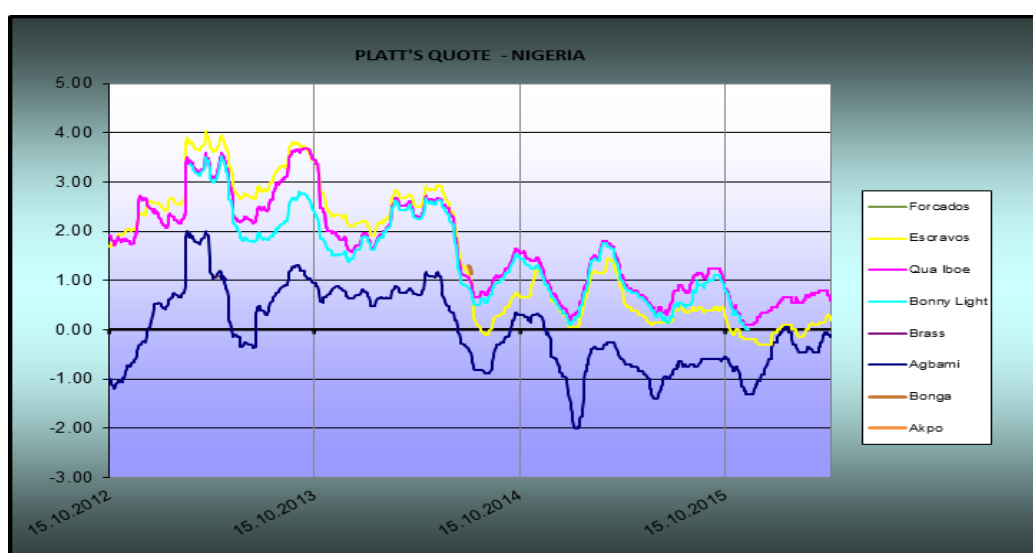
Traditionally a light and sweet Nigerian crude is traded at a premium to Dated Brent, as illustrated on the figure below, the three most traded crudes “Escravos”, “Qua Iboe” & “Bonny Light”, through 2012 – 2013, was sold at a premium (Dated Brent + 3.80\$/bbl.). In late 2013, we can see that Bonny Light was shifting away from the other two most traded crudes, this is due to less exportations to the USA, Bonny Light was one on the most traded light and sweet crude towards USA.

Furthermore, we can see how the oversupply of light oil in the market has impacted the Nigerian crudes; we can see the downward trend in the premium. As Mr. Angel Martinez stated the most traded Nigerian crude is Qua Iboe towards Europe, thus, I have highlighted also that he stated that a Qua Iboe was selling at Dated Brent + 3.50\$/bbl. in 2012, but today it is selling at 2.50\$/bbl. below.

The Nigerian Crude Oil market is in difficulty due to the oversupply in the market and the eventually low prices of crude.

Just to state, as mentioned before Nigeria depends heavily on their crude oil sector which makes up 90% of their GDP, thus, the downward trend has highly impacted their economy, notable the fiscal revenue has dramatically fallen, leaving the country in a peril situation¹⁰ and lowering their FDI (Foreign Direct Investment), (IMF Report, 2016).

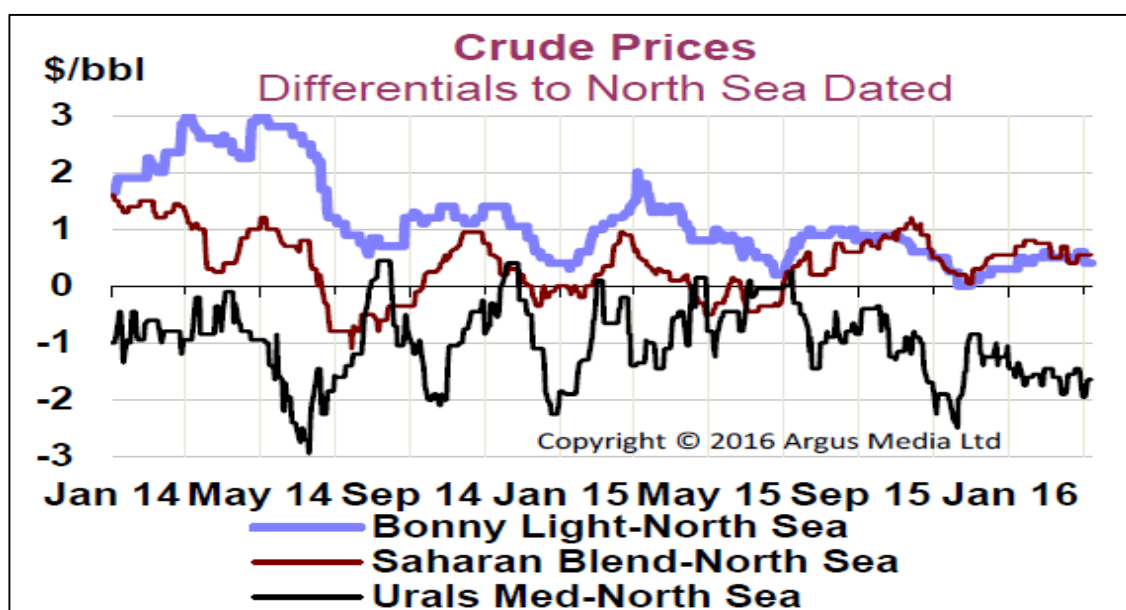
Figure 12 – Differentials of selected Nigerian Crude oils



Source: SOCAR, 2016.

¹⁰ Appendix 7 : Nigeria : Macro and Financial Impact of Lower Oil prices

Figure 13 – Differentials to North Sea



Source: Argus Media Ltd, 2016.

The above figure shows three selected grades to compare with North Sea Dated. China took the advantage of the lower oil price by going on a buying spree at the beginning of the year, as the same for India. India bought in April 2016, around 10 million barrels of Iraqi Basra crude (API 29.7% and Sulfur 2.85%) and Nigerian grades in order to support its new 300 kb/d Paradip refinery.

According to the source above, in Europe, Nigerian barrels were under pressure due to weaker refining margins. But, increasing supplies from Nigeria are heading to the US as domestic light tight oil output slows.

Furthermore, falling domestic supply has in turn boosted the price of North American grades, with Bakken rising to a record premium to WTI – closing the arbitrage opportunity to move barrels by rail to the East Coast. The LLS/Brent differential is close to parity, signaling that the end of light crude imports to the Gulf Coast might be drawing near (IEA, 2016).

Saudi Arabia followed market trends by lowering its monthly formula prices for April shipments to the US, while increasing the differential on its flagship Arab Light grade for sales to Europe and Asia. Benchmark Dubai fell below \$30/bbl. at the start of the year, boosting demand for Middle East and Russian crude in Asia. That pushed up prompt prices versus future months, narrowing the contango structure – an indication that higher Middle East formula prices were to be expected (IEA, 2016).

4. Oil Industry

4.1 Industry Structure

The Industry can be classified into three different segments:

- 1) The International Companies
- 2) The National Oil Companies
- 3) The Independents

4.1.1 The International Oil Companies (IOCs)

These companies are often called the “majors”. Companies like ExxonMobil, Royal Dutch Shell, BP, Chevron, Eni, ConocoPhillips and Total, make up the IOCs. These companies can be considered as easy access to capital and extensive skills, capable of handling significant investment risks.

4.1.2 The National Oil Companies (NOCs)

These companies may often be the operators of the fields and also the owner, thus, the case for NNPC in Nigeria.

Conversely, these companies are starting to become international, in order to diversify investment risks and to secure output to meet the needs of their fast growing economies.

These companies have become today’s major resource holders, and together they control more than 90 percent of the proven global reserves. Moreover, they represent about 70 percent of worldwide oil and gas consumption. The NOCs often manage their resources in a more long-term perspective compared to the private companies that are more eager to capture shorter-term profits. Moreover, the majority tends to be followers of new technologies rather than developers (Aubert & Frigstad, 2007: 15).

4.1.3 The independents

These companies are smaller, private companies that specialized in smaller scale projects. They mostly focus on particular geographical areas or types of reservoir. These companies do not always have the same financial strength as the IOCs.

4.1.4 Organisation of Petroleum Exporting countries

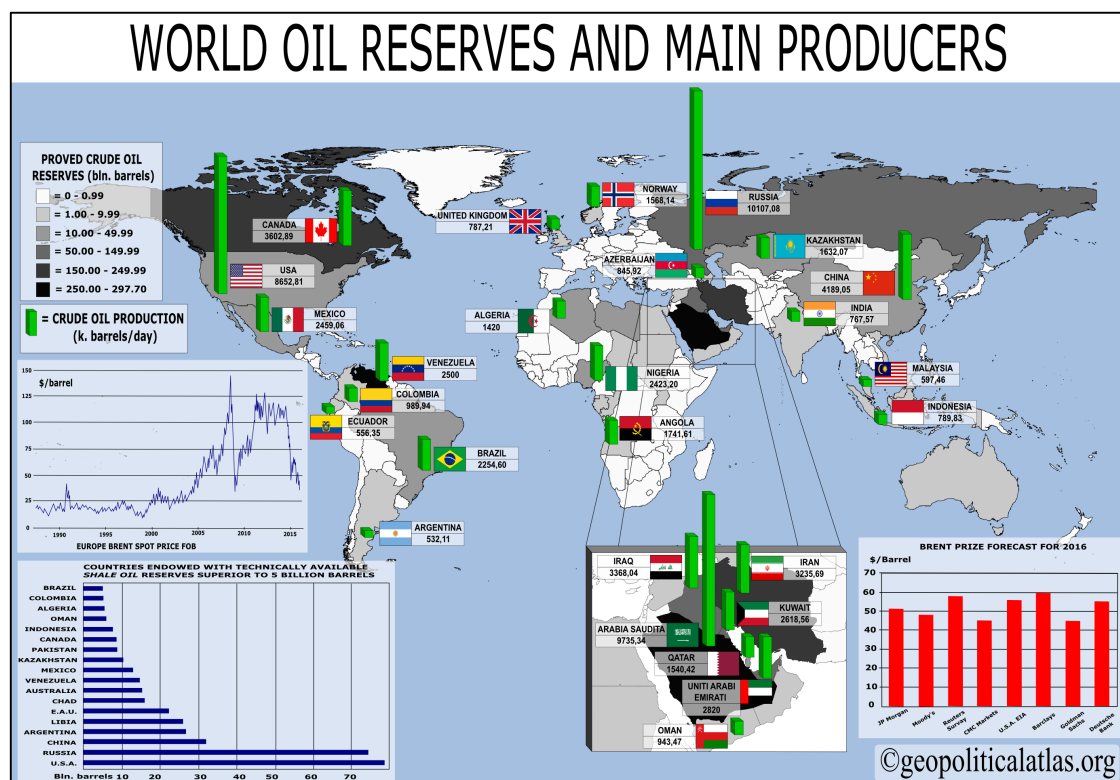
OPEC is mostly considered as a cartel and it is an intergovernmental organization dedicated to the stability and prosperity of the petroleum market. It plays an important role in the global oil industry as the majority of the remaining reserves are located in OPEC regions.

In 2007, OPEC has 12 countries as members, which currently supply more than 40 percent of the world's oil and control about 79 percent of the world's total proven crude oil reserves (Aubert & Frigstad, 2007: 16).

4.2 Analysis of the Oil Industry

4.2.1 World Oil Reserves

Figure 14 – World Oil Reserves and Main producers



Source: Geopoliticalatlas.org, 2016.

The above figure represents the world oil production combined with proved reserves and projections for Brent spot prize, prize prediction and shale oil reserves in 2016. With the following figure, we can see that the highest proved crude oil reserves (billions of barrels) is located in the Middle East, were majority of the crudes are known to be medium to heavy and sour.

Marketing Nigerian light and sweet crudes in a world increasingly geared towards heavier and more sour crudes.
Tanya Kedisha COLE

In addition, regarding the crude oil production per day, we can also see that the Middle East has the highest production of crude oil with 2,426,152 k. barrels/day combined, following by North America with 122,557 k. barrels/day and lastly, Russia with 10107,08 k. barrels/day.

4.3 Cost structure

The Oil Industry is glutted with oversupply of crude oil. The market is in quite a drastic stage with a persistent falling price. It is interesting to see if the marketing dynamics will re-change or shift back in a bullish market.

By observing the cost curve below, for all oil producer countries, less profitable for them, since the oil price is weak and no production cut has since been done, in order to re-balance the demand and supply curve.

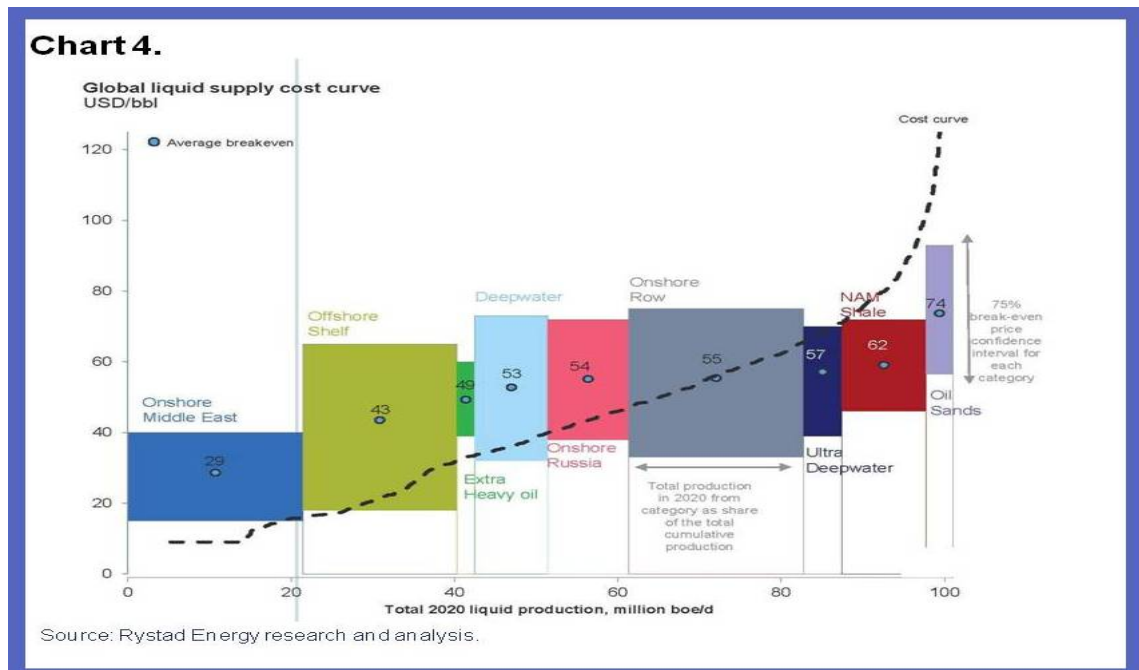
Assumptions were made that OPEC, and in particular Saudi Arabia, will be willing to cut production in the future. This in turn depends in part on the motives behind its change in strategy, and the relative importance of geopolitical and economic factors in that decision (IMFdirect, 2014).

IMFdirect blog has cited that, *“a hypothesis is that Saudi Arabia has found it too costly, in the face of steady increases in non-OPEC supply, to be the swing producer and maintain a high price. If so, and unless the pain of lower revenues leads other OPEC producers and Russia to agree to share cuts more widely in the future, the shift in strategy is unlikely to change soon. Another hypothesis is that it may be an attempt by OPEC to reduce profits, investment, and eventually supply by non-OPEC suppliers, some of whom face much higher costs of extraction than the main OPEC producers.”*

Assumptions were made that investments will not be able to respond to low oil prices. IMFdirect blog has cited that: *“there is some evidence that capital expenditure on oil production has started to fall and according to Rystad Energy, overall capital expenditure of major oil companies is 7 percent lower for the third quarter of 2014 compared to 2013.”*

The below figure shows the different cost and breakeven point for the different types of crude whether offshore or onshore or oil sands production. The figure also gives the world marginal cost curve, showing how much it costs to produce an additional barrel by type of oil extraction.

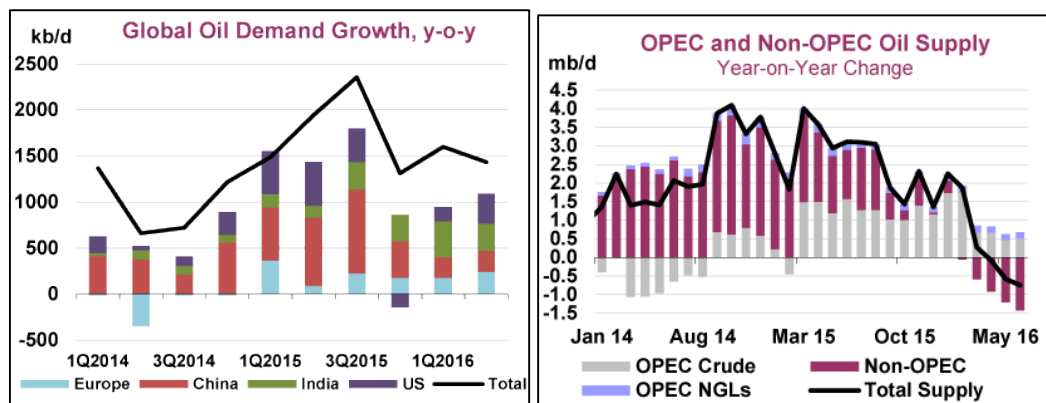
Figure 15 – Global Liquid Supply Cost Curve



Source: IMFDirect, 2014.

4.4 Demand and Supply

Figure 16 – Global Demand and Supply



Source: IEA, 2016.

On the demand side, in the first quarter of 2016 has increase by 0.1 mb/d to 96.1 mb/d, this is due to the resilience of Europe. The figure above shows that there was an increase in oil demand in the USA, and inconsistent growth for India and China. In 2017, India is forecasted to be the world's highest consumer.

On the supply side, we can see that in May 2016 the oversupply has been decreasing, due to the wildfire in Alberta and different disruption in supply, especially the Nigerian

rebel attacks had helped in the decrease of output. However, in June, output rose by 0.6 mb/d to 96 mb/d, meaning that supply is a bit lesser than demand. Also, with the highest market share Middle Eastern oil production has risen to 31.5 mb/d.

4.5 Crude Oil Price

4.5.1 Brent Spot Price

Crude price has gained ground since the supply fell slightly. In June 2016, price was at 52\$/bbl., as stated above factors such as disruption in the supply, in Nigeria and Canada and decline in the USA domestic production over 2 months.

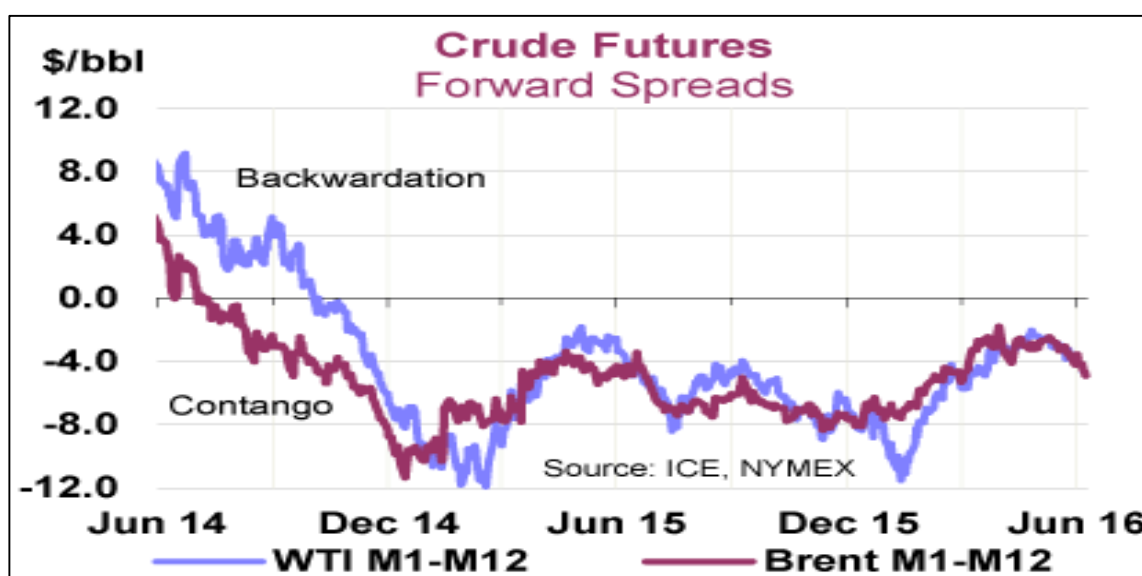
4.5.2 The Future Market

The future has been in contango since the glut of oversupply. The ICE Brent's kept the contango structure in June with the M1-M2 spread at a -\$0.53/bbl. discount compared to -\$0.48/bbl. in May (IEA, 2016).

On the NYMEX market, WTI, held the same structure, with the discount of prompt month to second month at -\$0.62/bbl. in June versus -\$0.59/bbl. in May (IEA, 2016).

On forward curves, the WTI M1-M12 spread widened to -\$3.13/bbl. in June from -\$2.79/bbl. in May. The Brent M1-M12 contract spread was stable at -\$3.13 /bbl. in June versus -\$3.15/bbl. in May (IEA, 2016).

Figure 17 – Crude Futures



Source: IEA, 2016.

5. Trends in the Oil industry

The global oil refining landscape is changing fundamentally and the stringent transport fuel regulations and requirements in Europe and North America: meaning that demand of higher quality product with reduced sulfur content has increased.

5.1 Evolution of Refineries

Refineries are the crucial manufacturing intermediary between crude oil and refined products. In recent years, the industry has undergone important structural changes. Since 1970, more than 20 refineries have closed, while others have expanded their capacity to increase efficiency and remain competitive (Canadian Fuel Association, 2013: 2).

Important to note that a changing pattern in fuel demand is the new trend. And the processing of heavier crudes and increasing refinery complexity and the growth in traded refined fuels has increased over the years.

The refining business is a capital intensive business. It is quite costly to implement a refinery and to maintain it as well. The cost varies depending on the location, the types of crude to be processed and the range of outputs (both of the latter affect the configuration and complexity of the refinery) (Canadian Fuel Association, 2013: 3).

Most refineries have shut down since the cost of adding new capacity or complexity to an existing refinery is very expensive, and even after building the refinery it is highly costly to run. As mentioned above, more refiners have switch to more complex refineries, since this increase flexibility, so that they can adapt to constant changes in the market conditions for both inputs and outputs. Canadian Fuels report states that: *“complex refineries now represent the vast majority of the world’s refining capacity.”*

Advantages of more complex refineries:

- 1) More value from the product slate
- 2) Ability to process a wider range of crude oil types
- 3) Flexibility to adjust to changing markets and local fuel specifications

To add, the largest refinery that is designed to globally export, with the advantage of lower capital, lower labor and environmental compliance costs, is in Jamnagar, India with a NCI of 14.

5.1.1 Measurement of complexity (NCI)

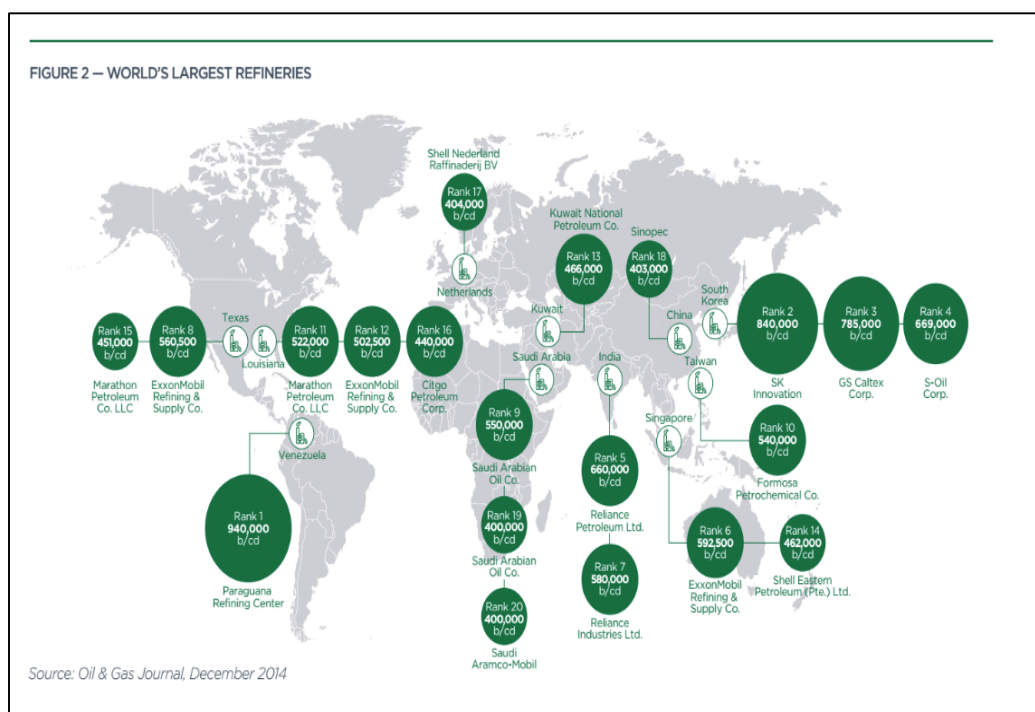
The Nelson Complexity Index is a pure cost-based index that provides a relative measure of refinery construction costs based on the distillation and the upgrading capacity of the refinery.

NCI assigns a complexity factor to each major piece of refinery equipment based on its complexity and its cost in comparison to crude distillation. Thus, a complexity factor is assigned = 1.0 then to find the complexity, we multiply the complexity factor by its throughput ratio as a percentage of crude distillation capacity.

To finish, we need to sum all the complexity values assigned to each piece, this determines a refinery's complexity on the NCI (OGJ, 1996).

5.1.2 Refineries worldwide

Figure 18 – World's largest Refineries



Source: Oil & Gas Journal, 2014.

The above figure shows the top 20 largest refineries worldwide. With India and Europe being a key partner for the Nigeria, this could be an advantage for the Nigerian Market.

6. Discussion

6.1 *Nigerian Market Discussion*

The finding has proven that the market is facing difficulties, not only with the assumption that the world is increasingly geared towards heavier and more sour crude but with the fact that the market is facing the ongoing corruption within the NNCP; most literature read stated that the sabotage and theft mostly starts within the National Oil Company, because of lack of transparency.

It is hard to determine the actually amount of production that is pumped out of the Niger Delta area, no one actually knows the correct amount of the daily output or the correct amount that is been exported, yes, we see figures but the Nigeria market is so opaque and no one talks about the black market.

The other discussion is that maybe the Nigerians' crudes are being devalued since the BFOE blend is combined mostly of the Fortis, which is a sourer crude. This is the case because the oil fields in the North Sea with light crudes are pumping less and less, as oil fields are very mature.

Most traders or marketers are questioning the mark-up of the benchmark and how resourceful it is to price their crude.

Furthermore, the USA market has been swinging back and forth again, to the Nigerian market, this due to the slowdown in their production. As Mr. Martinez stated in his interview, this Shale Boom will not last on the long run, because they are incurring losses. And to drill the wells, it's quite expensive and long. The only way to survive is by investing in the drilling of wells.

Nigeria, yes, needs to secure more trading partners, such as Brazil and India, these are emerging markets with rapid growth. They also need to secure their market with China as well as the USA, even if it is a small pie.

Regarding the refineries, the market is shifting towards the East and it is where all the complex refineries are located. I presume that Nigerian Crudes will eventually have difficulties in Marketing their crudes in the East, since most refineries will tend to buy cheaper crudes. But for the moment, refineries are profiting from the low oil price in order to buy the premium crudes at a discount. But how long this will last? No one actually knows, because the oil industry is just unpredictable.

Regarding the hypothesis, we can refute the HO that states, “the Nigerian light and sweet crudes are in distress since the market is moving towards heavy and sour crudes. “

Therefore, we can accept H1 that states, “the Nigerian light and sweet crudes are not in distress because the market is moving towards heavy and sour crudes.”

H1 was accepted because, I have tried to illustrate that the Nigerian crude oil market is in distress but by the challenges faced such as corruption in its Management, sabotage, lack of infrastructure, oil theft and most important the loss of one of their key partners and the low oil prices.

In my opinion and based on the analysis, we could presume that the majority of the crudes that are traded or marketed are light crudes since Saudi Arabia does not trade its crude. We can state that the market is oversupply with light crudes.

But in reality, we can also presume that the market is indeed heading towards heavy and sour crudes, as refinery complexity is increasing; sulfur content will easily be eliminated. Therefore, the incentives for refiners, is to buy low cost crudes. And may in the long run will have an impact in the trading of light crudes.

6.2 Difficulties /Limitations

Whilst during my research paper, I have encountered difficulties with redefining my subject, it was a very difficult task to do.

I had little or no information or trustworthy information about the Nigerian market, as mentioned before the market is very opaque. There was no precise literature that was done on this topic.

As for the undergoing changes in the market, I had to keep on reading, since the market is so dynamic and very unpredictable.

Unfortunately, an interview was planned and was not able to be done with Mr. Janvier Nkurunziza, from the United Nations Conference on Trade and Development (UNCTAD).

7. Conclusion

My objective was to demonstrate that the new trend “global structural transforming” in the oil refining market had no significant impact on the Marketing of Nigerian light and sweet crude oils.

The real significant impact on the Marketing of Nigerian light and sweet crude oils, as mentioned before is the Management style of the NNPC; the lack of information that is provided, the lack of infrastructure in Niger Delta areas, and the decrease in their FDI has dramatically caused distress in the Nigerian Oil Market.

Concerning external challenges, the American Shale Boom has impacted the crude exportation to the USA and this Revolution has caused not only distress in the Nigeria Market but on a global scale, with fallen crude oil prices and the conquer for market share among producers.

My recommendations for the Nigerian market is to fight against corruption within the NNPC. Difficult to say how they could fight against such battle, but they could implement more internal controlling system and have more risk management tools and action plans in order to mitigate or avoid the risk of oil theft and sabotage.

Most of the crudes that are stolen do not stay on the Nigeria’s soil, but are shipped. I could suggest that Nigeria could put in place a system that tracks the oil theft market. This measure will be difficult to put in place, as Nigeria is quite a poor and indebted country.

The relief of the market is a long way ahead, firstly, the bullish Oil Market has to redeem with a continuous increase in price, so that supply and demand can rebalance. With this done, Nigeria market may relief a bit with high crude price, but how long this bullish market will last?

With all these incentives, to buy low (short) and sell high (long), the crude oil market is in a long run with low crude oil prices, and distress for producers. The only winners in the market right now are traders (big oil companies, such as Trafigura and Vitol) has earned loads on the contango curve by locking in margins.

To conclude, the research done was to enable my readers to gain a clear understanding about the Crude Oil Industry and to illustrate that there is no prediction in such market, since factors such as demand and supply influence every bit of the market.

Bibliography

Appendices

Appendix 1: Interview – Mr. Angel Martinez

Appendix 2: Interview – Mr. Janvier Nkurunziza

Appendix 3: Interview – ICE Brent Futures Contract

Appendix 4: Interview – WTI Futures Contract

Appendix 5: Interview – Niger Delta

Appendix 6: Interview – NNPC Operation

Appendix 7: Nigeria: Macro and Financial Impact of lower oil prices

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Appendix 1: Interview with SOCAR

An interview was done with Mr. Angel Martinez, in the SOCAR office in Geneva on the 20th April 2016.

1. How important is the crude oil trade in Nigeria?

According to Mr. Martinez, the crude oil industry is the heart of Nigeria economy. He stated that Nigeria and its government depend solely on this commodity for its fiscal revenue, thus maintaining economy growth.

2. Regarding the market actually, do you as a trader feel the competition from US and (light and sour)?

Mr. Martinez stated that as a trader, he actually does not feel the competition since the trading company has its specific clients who they buy from. He stated they still are buying from Nigeria, as the flat price is still quite attractive for them.

3. Do you think there is a future for the Nigerian oil market?

Mr. Martinez stated that the Nigeria Market is such an unpredictable market as well as the oil industry on a whole. Yes, Nigeria is facing the competition from the USA and has lost one of its exporting partner. But he thinks that they still have the European Market, as the European regulation are very strict.

On the other hand, he said that, the American Shale Boom will not last forever, as the Saudi Arabian's were not cutting production. One day eventually the Americans will stop drilling, because it is expensive for them, they are only incurring losses.

4. Do Nigeria feel the pressure from its neighbor Angola in terms of competition?

Mr. Martinez said no. He stated that Nigeria and Angola has their own specific customers. He added that Nigeria crudes are heading mostly to India and Europe, while Angola crudes are heading mostly to China, and not much in Europe.

Appendix 2: Interview with UNCTAD

An interview was supposed to be done with Mr. Janvier Nkurunzia, via LinkedIn on August 7th 2016, unfortunately I had no reply.

My subject is “Marketing Nigerian light and sweet crudes in a world increasingly geared towards heavier and more sour crudes.

1. Could you please give your input regarding the following subject above? Do you actually think the world is geared towards heavier and sour crudes? If yes/no, why?
2. Regarding investments, do you think the Nigerian market will obtain “more investments”? If yes, what are the risk for these investors?
3. And if no, how would the Nigerian market prevail without investments in their oil field?
4. What do you think are the different trends in the crude oil market at the moment?
5. And how do these trends may affect the marketing of Nigerian light and sweet crudes? What are the impact on the Marketing of the Nigerian crudes?
6. Within my findings, I found that the next China is “India”, i.e. the next key consumer for oil will be India. The Nigerian market is actually struggling with the shale boom; do you think a key strategy for Nigeria is to secure the India Market? If yes/no, why?
7. Which other market should they secure in order to be competitive and market their crudes? (example: Brazil and Europe?). Do you actually think Europe and Brazil could become another key exporting partners for Nigeria?
8. The refineries worldwide are becoming quite complex (especially in India and China). How do you think this trend will impact the Marketing of Nigerian light and sweet crudes?
9. What strategies should Nigeria undertake in order to Market their crudes and in order to be competitive in the oil market? Is diversification, one of this strategy?
10. Is there a future for Nigerian light and sweet crudes?
11. What is your input towards the shale boom, is this boom a long-term or short-term impact on the Nigerian Market? (How long this boom may last?)

Appendix 3: ICE Brent Futures Contract

Brent Crude Futures

Contract Specifications

Description	The ICE Brent Crude futures contract is a deliverable contract based on EFP delivery with an option to cash settle.
Contract Symbol	B
Contract Size	1,000 barrels
Units of Trading	Any multiple of 1,000 barrels
Currency	US Dollars and cents
Trading Price	One cent (\$0.01) per barrel
Settlement Price	One cent (\$0.01) per barrel
Minimum Price Flux	One cent (\$0.01) per barrel

Contract Specifications

Expiry Limits	<p>The Exchange may impose limits on positions in this contract at its discretion in accordance with Exchange Rule P3.</p> <p>Current expiry limit: 6,000 contracts in the last five business days, up to and including the expiry day in the spot month, inclusive of futures-equivalent position in Brent Options.</p> <p>Exemptions from expiry limits may be granted at the Exchange's discretion to participants who provide and document a commercial rationale for their requirement</p>
Contract Series	Up to 96 consecutive months
Trading Methods	Electronic futures, Exchange of futures for physical (EFP), Exchange of futures for swap (EFS) and Block Trades are available for this contract.
Delivery/Settlement Basis	The ICE Brent Crude futures contract is a deliverable contract based on EFP delivery with an option to cash settle against the ICE Brent Index price for the last trading day of the futures contract. The Exchange shall publish a cash settlement price (the ICE Brent Index price) on the next trading day following the last trading day for the contract month.
Business Days	ICE Business Days

Daily Settlement	The weighted average price of trades during a two minute settlement period from 19:28:00, London time.
Daily Margin	All open contracts are marked-to-market daily.
Position Limits	The Brent crude future is a cash-settled contract. The Exchange's daily position management regime requires that all positions in any contract month must be reported to the exchange on a daily basis. The Exchange has powers to prevent the development of excessive positions or unwarranted speculation or any other undesirable situation and may take any steps necessary to resolve such situations including the ability to mandate members to limit the size of such positions or to reduce positions where appropriate

Contract Specifications	
Expiration Date	<p>Contract Months up to and including February 2016:</p> <p>Trading shall cease at the end of the designated settlement period on the Business Day (a trading day which is not a public holiday in England and Wales) immediately preceding either:</p> <p>(i) the 15th calendar day before the first calendar day of the contract month, if such 15th calendar day is a Business Day; or,</p> <p>(ii) if such 15th calendar day is not a Business Day the next preceding Business Day.</p>
	<p>Contract Months from March 2016:</p> <p>Trading shall cease at the end of the designated settlement period on the last Business Day of the second month preceding the relevant contract month (e.g. the March contract month will expire on the last Business Day of January).</p> <p>If the day on which trading is due to cease would be either: (i) the Business Day preceding Christmas Day, or (ii) the Business Day preceding New Year's Day, then trading shall cease on the next preceding Business Day</p>
Contract Security	ICE Clear Europe acts as the central counterparty for trades conducted on the London exchanges. This enables it to guarantee the financial performance of every contract registered with it by its members (the clearing members of the exchanges) up to and including delivery, exercise and/or settlement. ICE Clear Europe has no obligation or contractual relationship with its members' clients who are non-member users of the exchange markets, or non-clearing members of the exchanges.

Source: CME Group, 2016.

Appendix 4: WTI Futures Contract

Contract Specifications		
Light Sweet Crude Oil (WTI) Futures	Futures	
Options		
Product Symbol	CL	LO
Venue & Hours (NY Time/ET)	CME Globex CME ClearPort Open Outcry	Sunday – Friday 6:00 p.m. – 5:15 p.m. (5:00 p.m. – 4:15 p.m. Central Time/CT) with a 45-minute break each day beginning at 5:15 p.m. (4:15 p.m. CT) Monday – Friday 9:00 a.m. to 2:30 p.m. (8:00 a.m. to 1:30 p.m. CT)
Contract Size	1,000 Barrels	A Light Sweet Crude Oil Put (Call) Option traded on the Exchange represents an option to assume a short (long) position in the underlying Light Sweet Crude Oil Futures traded on the Exchange.
Price Quotation	U.S. Dollars and Cents per barrel	U.S. Dollars and Cents per barrel
Min. Fluctuation	\$0.01 per barrel	\$0.01 per barrel
Termination/ Expiration	Trading in the current delivery month shall cease on the third business day prior to the twenty-fifth calendar day of the month preceding the delivery month. If the twenty-fifth calendar day of the month is a non-business day, trading shall cease on the third business day prior to the last business day preceding the twenty-fifth calendar day. In the event that the official Exchange holiday schedule changes subsequent to the listing of a Crude Oil futures contract, the originally listed expiration date shall remain in effect. In the event that the originally listed expiration day is declared a holiday, expiration will move to the business day immediately prior.	Trading ends three business days before the termination of trading in the underlying futures contract.
Listed Contracts	Crude oil futures are listed nine years forward using the following listing schedule: consecutive months are listed for the current year and the next five years; in addition, the June and December contract months are listed beyond the sixth year. Additional months will be added on an annual basis after the December contract expires, so that an additional June and December contract would be added nine years forward, and the consecutive months in the sixth calendar year will be filled in. Additionally, trading can be executed at an average differential to the previous day's settlement prices for periods of two to 30 consecutive months in a single transaction. These calendar strips are executed during open outcry trading hours.	Crude oil options are listed nine years forward using the following listing schedule: consecutive months are listed for the current year and the next five years; in addition, the June and December contract months are listed beyond the sixth year. Additional months will be added on an annual basis after the December contract expires, so that an additional June and December contract would be added nine years forward, and the consecutive months in the sixth calendar year will be filled in.
Settlement Type	Physical	Exercise into Futures
E-mini Crude Oil Futures		
Product Symbol	QM	
Venue & Hours (Eastern Time/ ET)	CME Globex CME ClearPort Open Outcry	Sunday – Friday 6:00 p.m. – 5:15 p.m. (5:00 p.m. – 4:15 p.m. Central Time/CT) with a 45-minute break each day beginning at 5:15 p.m. (4:15 p.m. CT) Monday – Friday 9:00 a.m. to 2:30 p.m. (8:00 a.m. to 1:30 p.m. CT)
Contract Size	500 barrels	
Price Quotation	U.S. dollars and cents per barrel	
Min. Fluctuation	\$0.025 per barrel	
Termination	Trading in the current delivery month shall cease on the business day immediately preceding to the last day of trading in the current delivery month of the NYMEX Light Sweet Crude Oil futures contract.	
Listed Contracts	Current year and 5 calendar years	
Settlement Type	Financial	

*These contracts are subject to the rules and regulations of NYMEX.

Source: NYMEX, 2016.

Appendix 5: Niger Delta

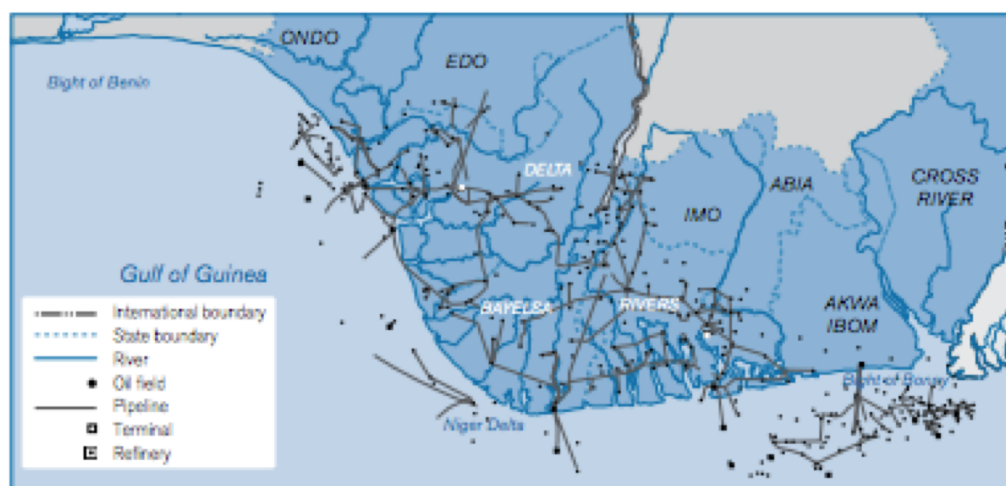
States of the Niger Delta



Rivers of the Niger Delta

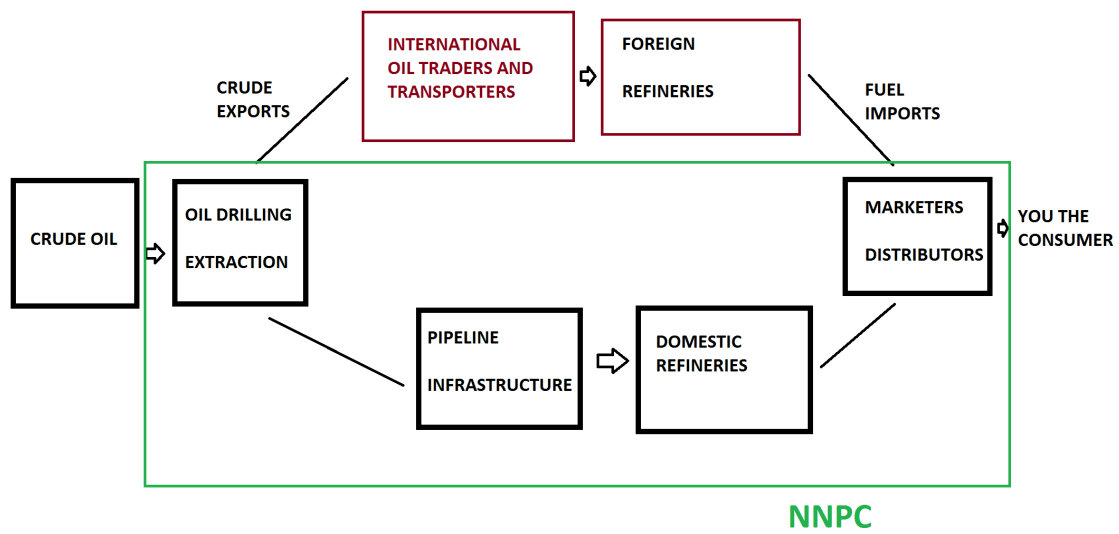


Oil installations in the Niger Delta



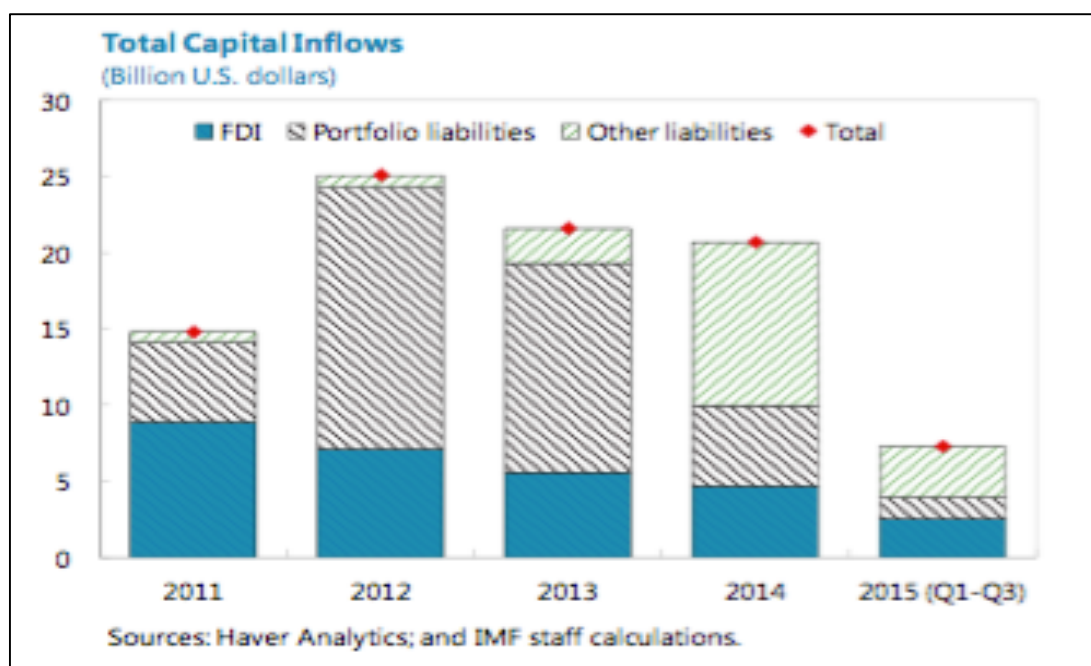
Source: IMF, 2016.

Appendix 6: NNPC Operation

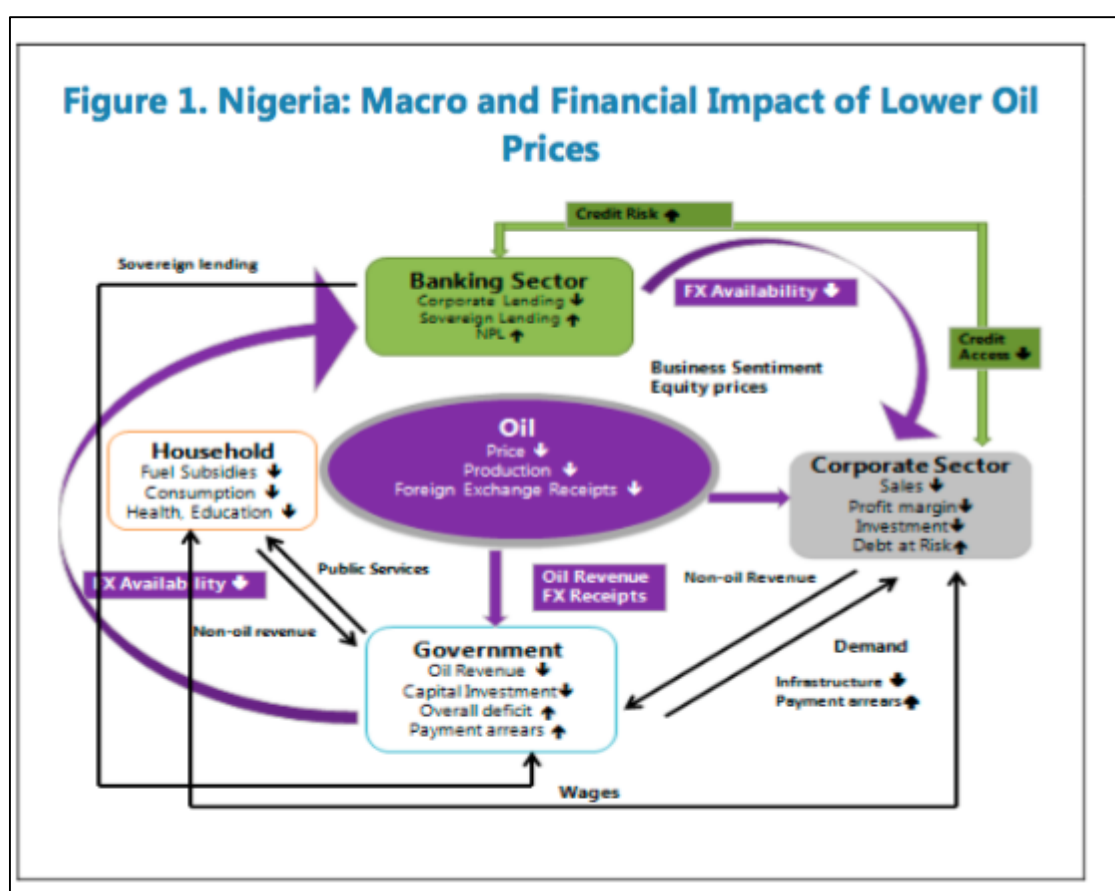


Source: Nomos Obikili's Blog, 2016.

Appendix 7: Nigeria: Macro and Financial Impact of Lower Oil prices



Source: IMF Country Report, 2016.



Source: IMF Country Report, 2016.