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Impact of Project Planning and Distribution Matrix on Economic Growth: the Nigeria Petroleum Industry Act Perspectives

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Abstract

This Study examined the Impact of Project Planning and distribution matrix on oil contribution to national gross domestic product, with reference to the petroleum industry act. The theory of change portends that planning process affects the outcome of a project and this research attempts to validate this maxim in the light of the newly approved petroleum industry act, 2021. Secondary data capturing oil production (OPB) used as proxy for project planning, oil consumption (OCB) used as proxy for distribution matrix and mechanism, and oil sector GDP contribution (GDPC) with Exchange rate (EXCR) as test variables, obtained from US energy information administration and the World Bank were used covering from 1998 to 2021. Econometric tests of unit root, autocorrelation, regression and co-integration were used to test for the impact of the exogenous variables on the endogenous variable at the 5% level of significance. The result indicates that while the OPB had positive and significant impact on oil sector contributions to GDP in both short-run and long-run periods, OCB only showed a positive co-integration. The study concludes that project planning captured by OPB exerts a positive and significant impact on petroleum sector contributions to national GDP; and recommends the adoption of sound project planning procedures with effective distribution mechanisms for the petroleum industry products to reach end-users. This we believe will help achieve the objectives of the new petroleum industry act.

Keywords: *Nigeria Petroleum industry, Petroleum industry Act, Project Planning, Distribution Matrix, Economic Growth.*

1.0 Introduction

The petroleum industry has special characteristics that need a different technique in project planning and management. The development of any country depends on the development of the energy reserves through investing in oil and gas projects through onshore and offshore exploration, drilling and increasing facility capacities (Alaba & Agbalajobi, 2014). Thus, these projects need a special kind of planning and management to match their characteristics, and effective project planning is a major tool to achieving a successful project (Munns & Bjeirmi, 1996).

Oil and gas sector comprises of three main activities – Upstream (exploration and production), midstream (transportation and processing) and downstream (distribution and sale to end users/consumer) (KPMG. 2021). These oil and gas activities include processes such as establishing a reservoir's stability and equipment functionality and are often headed by petroleum specialists.

A project execution strategy is a tactical approach used in project management. The project manager and team leaders creates the strategy during the planning stage to steer the project direction, and to align same with the company's business goals (Munns & Bjeirmi, 1996). Oil and gas development and production, like other projects will include production facilities, liquefaction plants, refineries, pipelines and storage tanks, product distribution etc.

The Nigeria ministry of petroleum resources provides the primary oversight function for the industry, with several other agencies acting in different regulatory capacities. Prior to the PIA, the oil and gas industry had four major regulations. Exploration, production and distribution of petroleum products in Nigeria is regulated by several statutes and subsidiary legislations. The most prominent of these laws is the Petroleum Act 1969, Petroleum Profits Tax Act, Deep Offshore and Inland Basin Production Sharing Contract Act, and Associated Gas Reinjection Act. Most of the laws and regulations are outdated and inconsistent with present economic and industry realities. The Petroleum Industry Act now provides a more robust framework to drive growth within the sector.

The delays in the passage of the PIA is one of the main reasons a number of large-scale oil and gas projects have been delayed in Nigeria (PWC, 2021). Large-scale projects like Bonga Southwest–Aparo (BSWA) and Bonga North and Etan–Zabazaba (EZ) have been on hold largely due to fiscal uncertainties in the oil and gas industry. These projects have the capacity to unlock larger reserves thereby reversing the depleting reserves and boosting production of hydrocarbons in Nigeria. According to RystadEnergy, Nigeria is estimated to have lost $15 billion annually due to the delays in passing the PIA (PWC, 2021).

Considering the projected decline in global demand for hydrocarbons, leading oil and gas production companies are cutting back significantly on their oil and gas business and on further investment into fossil fuel.

The PIA by its very essence is hydrocarbon-centered. While the PIA is expected to attract investment into the Nigerian oil and gas sector and serve as a catalyst for the development of the sector, the PIA doesn't say much on the energy transition and its likely impact on the sector and its outlook.

In recent times, clean energy has accounted for the majority of global investments in the energy sector. According to the International Energy Agency (IEA), investments in new power generation are expected to account for 70% of USD 530 billion to be spent on all new generation capacity in 2021. In 2017, the World bank announced that it would no longer finance upstream oil and gas projects. In exceptional circumstances in the poorest countries where there is a benefit to energy access and this is consistent with the countries' NDC commitments, the World Bank Group will consider upstream natural gas projects.

The foregoing puts to question how much investment Nigeria will be able to attract into the oil and gas sector with the signing of the PIA amidst the energy transition. The section 125 (PIA), clearly underpins the importance of effective distribution matrix as it provides the qualifications for the granting of license for midstream and downstream oil and gas operations involving establishing, constructing, or operating a facility for the processing of gas, engaging in bulk transportation of gas by rail, barge, or other means of transportation network etc.

With the Nigeria petroleum industry worth more than 37 billion barrels of proven crude oil reserve [which is estimated to last for the next 237 years of the country's existence, excluding unproven reserves] and 5.5 trillion cubic meters of gas (NNPC, 2020), 18 operating pipelines and average daily production capacity of 1.8 million barrels per day as of 2020, makes the country the 11th largest oil producer globally; also, with the industry accounting for about 9% of Nigeria's GDP and constituting an estimate of 90% of all export value, makes the subject of project planning and distribution matrix in the Nigeria Petroleum industry with reference to the recently gazetted Petroleum Industry Act, 2021 of paramount importance to the Nigeria

government at large and the national petroleum coordinating company, NNPC Limited in particular, as scholars in the industry are yet to come to a consensus on this subject.

This paper shall investigate the relevance and correlation of Project planning and Distribution Matrix (PPDM) in petroleum production volume to Nigeria's Economic growth under this new petroleum industry act regime, by dividing the study into five sections from 1. Introduction, 2. Literature Review, 3. Materials and Methods, 4. Data and Results and 5. Conclusion and Recommendations.

2.0 Review of Related Literature

This section reviews important concepts in relation to the Petroleum industry, supporting theories and views as well as important empirical to corroborate our position.

2.1 Conceptual Review

Project Planning: Planning is essential in the life of any project, as it is important for the successful execution of any project while at the same time resulting to risk minimization (Wang and Gibson, 2008; Dvir, Raz and Shenhar, 2003).

Conversely, inadequate analysis and planning by an organization will lead to a failed project (Morris, 1998; Thomas, Jacques, Adams and Kihneman-Woote, 2008). A major challenge in planning is determining how much of planning is required. A management project planning technique known as Analysis-Paralysis championed by Milosevic and Patanakul (2005), believes that when so much analysis takes place, no actual work is started or it is started much later than ideal. Gulick (1936) defined Project Management as working out a broad outline of the things that needs to be done and the methods for doing them to accomplish the purpose. In the Petroleum industry, so much amount of projects are required to be carried out from the downstream through midstream to the upstream, and so much degree of planning is needed. Planning will range from planning phase, planning effort to quality of planning.

Distribution Matrix

Distribution matrix entails all efficient logistics and strong distribution assets needed to respond rapidly and qualitatively to oil production and consumption demands of consumers and product end-users. The process includes ability to source product at competitive prices coupled with depots, tankage and fleet of trucks availability. The operations of petroleum product marketing and distribution companies and depots across the six geopolitical zones of the country and ease of hauling these products across to local companies, consumers and end-users comes within the purview of Distribution Matrix (Alaba and Agbalajobi, 2014).

ProjectWise Deliverables Management's Document Distribution Matrix (DDM) allows project teams to define and enforce access control based standardizations, helping to ensure that documents of a specific type are always reviewed by specific people. This capability allows administrators to manage project deliverables distribution more accurately, effectively and in a fully auditable way. - all this will help better manage risk and save a lot of time for our users' project teams.

Global Petroleum Industry Project Activities

The level of project planning, activities and management being executed globally in the petroleum sector is quite and could best be measured using a momentum index. The momentum index is based on scoring the latest developments on projects from +5 to -5 based on the degree to which a development is positive,

such as construction commencing or a contract awarded, or negative, such as delays or cancellations. The overall momentum score is the average score of all project developments in each month, weighted by the project values.

The oil and gas construction projects momentum index, which is based on GlobalData's construction projects database, depicts the monthly and trend scores of projects.

Monthly score is the average event score for all project developments in each month, while the trend score is the three-month moving average of the monthly score.

Table 1 – Global Momentum Index showing high volume project planning and execution

S/No	Project Name	Project Value (US$m)	Product Owner	Location	Stage
1	South Pars Gas Field Development	91,000	Pars Oil and Gas Company	Iran	Execution
2.	Libra Offshore Oil Field Development	80,000	China National Petroleum Corp;CNOOC New Energy Investment Co Ltd;Petroleo Brasileiro SA;Shell;TotalEnergies SE	Brazil	Execution
3	Lula Oil Field (ex-Tupi) Development	50,000	Petroleo Brasileiro SA	Brazil	Execution
4	North Field LNG Expansion	43,000	Qatar Gas	Qatar	Execution
5	Alaska LNG Development	38,700	Alaska Gasline Development Corp	USA	Planning
6	Iraq Strategic Crude Oil Export Pipeline	29,999	Ministry of Oil, Iraq	Iraq	Tender
7	Sunrise FLNG Development	20,500	ConocoPhillips;Ministry Of Transport and Communications, Timor-Leste;Osaka Gas Co Ltd;Shell Australia Ltd;Woodside Petroleum Ltd	Australia	Planning
8	Buzios Offshore Oil and Gas Field Extension	18,000	Petroleo Brasileiro SA	Brazil	Execution
9	Johan Sverdrup Oil Field Development	15,996	Aker BP ASA;Equinor ASA;Lundin Energy AB;Maersk Oil Norway AS;Petoro AS; Total Energies SE	Norway	Execution
10	Plaquemines LNG Facility	15,000	Venture Global LNG Inc	United States	Execution
11	Kish Gas Field Development	13,000	National Iranian Oil Co	Iran	Design

12	Marlim Offshore Oil Field Revitalization	12,000	Petroleo Brasileiro SA	Brazil	Execution
13	Salamat Gas Field Development	10,200	BP Alternative Energy Holdings Ltd;Ministry of Petroleum, Egypt;Pharaonic Petroleum Co	Egypt	Study
14	Ca Voi Xanh Offshore Gas Field Development	10,000	Exxon Mobil Corporation;Vietnam National Oil and Gas Group	Vietnam	Design
15	Bonny Island NLNG Train VII	10,000	Nigeria LNG Ltd	Nigeria	Execution
16	Zuluf Oil Field Development	9,680	Saudi Arabian Oil Co	Saudi Arabia	EPC Award
17	Liza Deepwater Oil Field Development	9,500	Exxon Mobil Corporation;Hess Corp;Nexen	Guyana	Execution
18	Bay du Nord Offshore Oil Field Development	9,387	Equinor ASA;Husky Energy Inc	Canada	Planning
19	Mad Dog Phase 2 Oil Field Development	9,000	BHP Billiton Petroleum;BP Corporation North America Inc;Unocal Corp	United States	Execution
20	Payara Deepwater Oil Field Development	9,000	Exxon Mobil Corporation;Hess Corp;Nexen	Guyana	Execution
21	Rosebank Oil and Gas Field Development	8,000	Equinor UK Ltd;Orsted UK Ltd;Siccar Point Energy E&P Ltd;Suncor Energy U.K. Ltd	United Kingdom	EPC Award
22	Offshore Floating Natural Gas Liquefaction Plant	7,000	Delfin LNG LLC;Hoegh LNG AS	United States	Design
23	KG Basin Oil and Gas Off-Shore Development: KG-DWN-98/2	5,076	Intecsea Inc;Oil and Natural Gas Corp Ltd	India	Execution
24	Iara Offshore Oil Field Development	5,000	BG Group Ltd;Galp Energia SGPS SA;Petroleo Brasileiro SA	Brazil	Execution
25	Vito FPU Offshore Oil Field Development	4,800	Equinor ASA;Shell plc	United States	Execution
50	Aje Oil and Gas Field Development	2,000	ADM Energy Plc;Energy Equity Resources Ltd;First Hydrocarbon Nigeria Ltd;Jacka Resources Ltd;Lekoil Ltd;New Age Exploration Ltd;Panoro Energy ASA;Vitol Inc;Yinka Folawiyo Petroleum Co Ltd	Nigeria	Planning

Source: GlobalData Construction Projects Database, 2022.

Top global oil and gas projects

Offshore Technology has identified the world's biggest oil and gas projects by value based on GlobalData's construction projects database.

South Pars Gas Field Development, Iran, Libra Offshore Oil Field Development, Brazil, and Lula Oil Field (ex-Tupi) Development, Brazil topped the list of the world's biggest oil and gas projects by value as of July 2022.

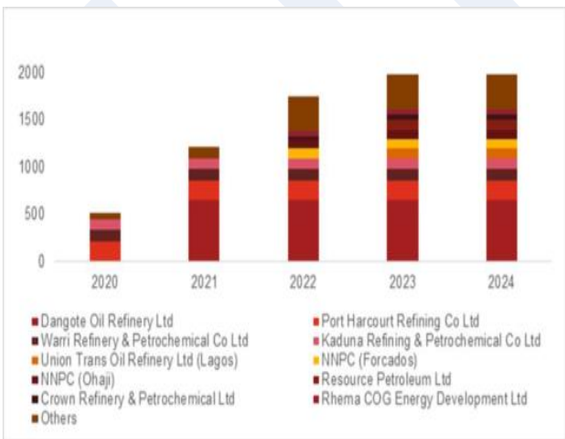
The top five oil and gas projects together accounted for a combined value of $302.7bn. The table equally pictures Nigeria as a major oil player in the globe with several projects in the down and upstream of the petroleum industry. The success of these projects in the oil sector of Nigeria, will largely depend on the planning quality invested as well as execution.

The Nigeria Petroleum Industry

The Nigerian oil and gas industry is segmented into the upstream, midstream and downstream sectors with several players and regulators playing across the value chain.

The upstream oil and gas sector is dominated by international oil companies (IOCs). Shell, Chevron, Mobil, Agip, Addax and Total, currently dominate the oil industry accounting for over 80% of the country's crude oil production. Activities in the sector are carried out under various arrangements including Joint Ventures (JVs) and Production Sharing Contracts (PSCs) with the Nigerian National Petroleum Corporation (NNPC). Other contractual arrangements include sole risk contracts and risk service contracts. The IOCs also hold more than 90% of the oil reserves and operating assets. Production by IOCs has shrunk over the past ten years by an annual average of 4%, while marginal field players have increased production by up to 15% annual growth rate.

Refinery capacity in Nigeria is expected to increase by 400% between 2020 and 2024 as new refineries such as Dangote Refinery spring up in addition to the rehabilitation of the Port Harcourt refinery.



Source: Public Information, NNPC, DPR, PwC Analysis

Figure 1: Nigeria Petroleum Industry Overview

Major Challenges Facing the Nigeria Petroleum Industry

•**Policy uncertainty**–The significant delay in enacting the Petroleum Industry Act into law for over a decade created an uncertain business environment which deterred investment into the sector resulting in lost opportunities. While the PIA has addressed many of these concerns, some uncertainties still remain in certain aspects such as price regulation, penalty regime and fiscal provisions.

•**Poor infrastructure**- There is a huge infrastructure deficit in the sector, particularly in the midstream and downstream sectors.

•**Insecurity**- Between 2019 and 2020, Nigeria experienced over 1,000 points of pipeline vandalism, kidnapping and other forms of insecurity. This has negatively impacted the performance leading to lower investment, high costs and decline in government revenues.

•**Impact COVID-19**: The impact of COVID-19 on the oil and gas industry has affected demand globally as well as prices. According to Statista, this has forced a drop in production from 2.07 mbpdQ1 2020 to 1.7 mbpdQ1 2021.

The Nigeria Petroleum Industry and Economic Growth

Nigeria is home to about 206 million people (Worldometers, 2020) and is Africa's largest market, with a young, growing and vibrant population. The population is forecast to grow by an average of 2.6% per annum (World Bank, 2020). This population growth is expected to fuel greater energy demand.

According to studies conducted by Price Waterhouse Company (2021), Nigeria's economy entered a recession in 2020, reversing three years of recovery, due to fall in crude oil prices as an aftermath of falling global demand and containment measures to fight the spread of COVID–19. The report further held that the economy lost $15.8 Billion as a result. The GDP contracted by -6.1% in Q2 and -3.62% in Q3 of 2020 before rebounding to 0.11% in Q4 of 2020. This brought Nigeria's GDP contraction to -1.98% due to the impact of COVID-19. The economy however has seen a recovery to 0.51% in Q1 of 2021 (NBS). The economy is projected to grow by 1.5% in 2021 and 2.9% in 2022, partly based on an expected recovery in crude oil prices and Nigeria's production.

Despite being a major source of revenue, the oil sector lags other sectors in terms of GDP contribution. The relative importance of the oil and gas sector in Nigeria appears to be declining, from 13% of Nigeria's GDP in 2013 to about 7% in 2020, while those of other sectors continue to increase. The federal government continues to seek means of diversifying the economy, particularly sources of government revenue and foreign exchange receipts to include Agriculture, Petrochemical, Refining, Retail, and ICT as priority sectors of the economy. It is clear however that even the oil sector needs to grow and be diversified to stimulate overall economic development.

The Nigeria Petroleum Industry Act, 2021 (PIA)

The long-awaited Petroleum Industry Act ("PIA") is here and it is expected to be a game changer for the petroleum industry in Nigeria. The upstream sector which has suffered low investment over the past decade is expected to be the major beneficiary of the changes in the PIA including the new fiscal regime.

The silver lining of the PIA on the energy transition is that it appears to focus on gas as the transition fuel for the country. It provides improved regulations and incentives for gas investment with tax holidays of up to 10 years and expansion of incentives to cover midstream gas operations. Section 64 of the act also stipulates that NNPC Limited is to engage in the development of renewable resources in competition with private investors. However, Nigeria needs to do more in providing the enabling infrastructure, regulatory framework and the right level of investment for the energy transition.

According to the World Economic Forum, a country's energy transition readiness is measured by six factors: the availability of investment and capital; effective regulation and political commitment; stable institutions and governance; supportive infrastructure and innovative business environment; highly skilled human capital and consumer participation; and robust energy systems structure. Based on these six factors,

Nigeria scores 35% in energy transition readiness. The lack of enabling infrastructure, regulatory framework and governance of energy transition are the major reasons for the low score.

The PIA stipulates that a Frontier Exploration Fund shall be maintained for the exploration of unassigned frontier acreages in Nigeria. The Frontier Exploration Fund shall be funded by 10% of rents on petroleum prospecting licenses, 10% rent on petroleum mining leases; and 30% of NNPC Limited's profit oil and profit gas in the production sharing, profit sharing, and risk service contracts. NNPC Limited shall transfer the 30% of profit oil and profit gas to the frontier exploration fund escrow account dedicated for the development of frontier acreages *only.* Exploration is a high-risk endeavour. In addition, raising the needed finance for the development, production and evacuation from the frontier basins might be a tall order as investors are staying away from high-cost emission-intensive assets. These basins will compete for funds with ambitious and more-environment friendly projects like gas, hydrogen, solar and wind.

Rather than a frontier exploration fund, Nigeria could consider setting up a "Future Energy Fund". The amounts being set aside in the PIA for the frontier exploration fund can be applied towards funding the development of Nigeria's future energy potentials, which will include but not be limited to petroleum, in readiness for the energy transition. The fund can also be deployed for funding the development of abatement technologies that can aid carbon neutrality.

Project Planning, Distribution and the Future of the Nigeria Petroleum Industry

The Future of the Petroleum Industry in Nigeria, Petroleum experts believe that oil prices will remain around $60 per barrel through 2024, which is significantly higher than rates reported in last year's oil market survey, which was between $40 and $60 per barrel (Berns et al, 2022). This views expectedly will guide world market operations as we approach 2023 and 2024 and Nigeria, of course is not excluded from this global oil market projections in fixing the budget oil price bench marks.

Global demands are expected to rise and prices will become highly volatile and the environmental regulations are expected to be more stringent. These development will trigger three challenges within the Petroleum industry, which include – reduced costs, optimize the performance of its industrial base assets and improve its environmental footprint (Veolia, 2022). Veolia (2022) observed that;

i) **Reducing Costs to Remain Competitive**: Crude oil and refined product production at a lower cost to stay competitive and relevant in the market is one of the industry's major challenge. Optimizing production systems and environmental utilities on currently operating sites is a major priority for the petroleum industry. This will lead to production efficiency, reduced costs of extraction and refining, thereby offsetting the cost of exploration.

ii) **Improving Performance to Ensure the Valorization of Assets**: In order to sustain supply of petroleum products, oil companies endeavor to extend the useful life of their sites in addition to seeking new sources of oil and gas, whose extraction, transport and refining are both more costly as well as complex. Hence, there should be 100% reliability of production plants, no unplanned shut-down, increased throughput as well as secure industrial assets.

iii) **Improving the footprints in the environment to meet increasingly stringent Standards**: The Petroleum industry is a major consumer of water and energy resources and thus, subject to increasingly stringent standards. This should constrain them to rethink Extraction, Production and distribution methods in order to maintain their operational license. They also have to provide guarantees and ensure

transparency in the management of their environment. In China for instance, SINOPEC, the largest refining company in Asia, which operates Beijing Yanshan Petrochemical complex in China, handles their water and waste management through well enshrined commitments to strict environmental standards.

2.2 Theoretical Framework

This work will employ the theory of Change to explain how planning affects the outcome of the project process and the theory was developed by Weiss in 1990. It helps to think through the project steps from the situation to the goal. The theory of change for a project describes why change is needed and how it will happen. In brief, it involves identifying how you would like the current situation with respect to the identified problem to change, and how the process will enable that change to come about. The theory shows how a programme would impact its beneficiaries, the ultimate impact it intends to achieve on them and all the separate outcomes that lead or contribute to the impact.

2.3 Empirical Framework

Several Scholars have studied the relationship between project planning and project successes with varying conclusions, some of which include:

Thomas, et al (2008) opined that the most effective team cannot overcome a poor project plan and projects started down the wrong path can lead to the most spectacular project failures. Morris (1998) similarly argued that the decisions made at the early definition stages set the strategic framework. If we get it wrong here, and the project will be wrong for a long time. Munns and Bjeirmi (1996) mentioned that for a project which is flawed from the start, successful execution may matter to only the project team while the wider organization will see the project as a failure.

Blomquist et al (2010) noted that Plans are cornerstone of every project; consequently planning is a dominant activity within a project context. This is a recurring theme: planning is inherently important to project success or one could argue project management would not exist.

Pinto and Prescott (1988) found that a schedule or plan had a correlation of 0.47with project success, while detailed technical tasks had a correlation of 0.57 and mission definition a correlation of 0.70. Pinto and Prescott (1990) again found that planning factors dominate throughout the project life cycle. Planning was found to have the greatest impact on the following success factors: “Perceived value of the project” (R^2 =.35) and “client satisfaction” (R^2 =.39). The coefficient of determining R^2 provides a measure of how well future outcomes are likely to be predicted by a model.

Shenhar (2001) noted that better planning is the norm in high and super-high technology projects. This was found to apply consistently to the deliverables normally produced in the planning phase. Dvir and Lechler (2004) found quality of planning had a +.35 impact on R^2 for efficiency and a +.39 impact on R^2 for a customer satisfaction.

Dvir, Raz and Shenhar (2003), in a rigorous paper noted the correlation between aspects of the planning phase and project success. The planning procedures effort was found to be less important to project success than defining functional and technical requirements of the project. The correlation was .297 for functional requirements and .256 for technical requirements. Zwikael and Globerson (2006) noted that organizations, which scored the highest on project success, also obtained the highest score on quality of

planning. Salomo, Weise and Gemünden (2007) studied the relationship between planning and new product development projects. They found that project risk management and project planning had an R^2 impact of .28, through the contribution of project planning was not significant. We consider risk planning part of the planning phase in this review therefore, overall R^2 =.28. In addition, they reported process formality and goal clarity gave a R^2 =.33 to success which are defined in the planning phase.

Adeyungbo and Adediran (2017), Studied the effects of oil revenue and institutional quality on Economic Growth with an ARDL approach, and discovered oil revenue promotes economic growth in the short-run but not in the long-run while institutional quality promotes economic growth in the short-run as well as in the long-run.

In summary, we noted that planning is absolutely essential for a successful project execution process in the petroleum industry.

3.0 Materials and Methods

3.1 Research Design

This research work adopted the ex-post facto research design method, using the output of an already completed process to test the correlation between project planning and distribution matrix in oil and gas production and Nigeria's economic output.

3.2 Population Sampling and Data Collection

The secondary data will be employed for this work, collated from USA Energy Information Administration and the index mundi/World Bank Group. The population sample is Nigeria and the sample period covered is between 1998 and 2021.

3.3 Data and Model Specification

This work will be modelled after the research work of Olayungbo and Adediran (2017), who tested the impact of oil revenue and corruption on economic growth in Nigeria:

$Y_t = f(GCF_t, CORR_t, OREV_t)$ ……. Eq.1 [Olayungbo and Adediran, 2017]

Where; Y = Gross domestic product

GCF = Gross capital formation

CORR = Institutional quality [proxy for corruption]

OREV = Oil Revenue

Modifying equation 1, we have;

GDPC = f (OPB, OCB) ……Eq. 2

Therefore, $GDPC = \beta_0 + \beta_1 OPB + \beta_2 OCB + EXCR + Ü$ ……. Eq. 3

Where, GDPC = Contribution of the oil and gas sector to Nigeria's Gross Domestic Product

OPB = Oil Production in Barrels per day, OPB will proxy for Project planning

OCB = Oil Consumption in Barrels per day, OCB will proxy for effective Distribution Matrix

EXCR = Official exchange rate, serving test variables since it is a common denominator for all foreign transactions

Both OPB and OCB will serve as indicators to measure the extent of project planning and distribution matrix of oil and gas output in the Petroleum Industry.

3.4 Apriori Expectation

It is expected that both OPB and OCB both representing Project planning and Distribution Matrix respectively, will have positive and significant impact on oil contribution to the gross domestic product (GDPC).

4.0 Data and Results

4.1 Data Presentation

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Prod. (mb/d)	2.167	2.066	2.159	2.268	2.087	2.223	2.430	2.527	2.433	2.208	2.172	2.211
Consumption	0.260	0.252	0.246	0.306	0.304	0.288	0.277	0.312	0.284	0.232	0.263	0.253
Exchange rate	21.89	21.89	85.98	99.04	120.97	129.36	133.5	132.15	128.65	125.83	118.57	148.9
GDP contribution	5.257	9.965	20.650	12.959	9.172	10.239	15.327	18.58	16.15	14.42	16.75	9.091

Source: US Energy Information Administration, World Bank Group, Statistica, 2022

Table 2 – NIGERIA DATA ON OIL PRODUCTION, CONSUMPTION & CONTRIBUTION TO GDP

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Prod. (mb/d)	2.533	2.459	2.409	2.276	2.273	2.199	1.898	1.986	2.005	2.101	1.828	1.626
Consumption	0.283	0.287	0.279	0.4	0.5	0.4	0.4	0.4	0.5	0.5	0.496	0.428
Exchange rate	150.3	153.45	157.79	153.21	170	199	300	305	305	360.06	358.80	403.58
GDP contribution	12.89	13.57	12.59	10.739	18.58	16.150	8.350	8.680	7.400	8.823	8.258	8.053

Source: US Energy Information Administration, World Bank Group, Statistica, 2022

Comments:

The table 2, shows crude oil production barrel per day, which is an indication of how well the petroleum industry projects have been planned to achieve targeted capacities (OPB); it also shows the million barrel of crude oil per day consumed by the local market, which also is a pointer to the distribution effectiveness of the industry. In overall, the contribution of the oil and gas sector to the national gross domestic product is captured while the exchange rate serves as the test variable for the research model. The feature of the variable relationship shows instability and is cyclical in nature, this depicts the dominant feature of the Nigerian petroleum industry.

4.1.1 Descriptive Statistics

Table 3 – Descriptive statistics

	EXCR	GDPC	OCB	OPB
Mean	178.4550	12.19350	0.335833	2.189333
Median	149.6000	11.66450	0.296000	2.203500
Maximum	403.5800	20.65000	0.500000	2.533000
Minimum	21.89000	5.257000	0.232000	1.626000
Std. Dev.	104.1394	4.143941	0.086941	0.222285
Skewness	0.750428	0.372360	0.720570	-0.523823
Kurtosis	2.628640	2.090525	2.170036	3.155670
Jarque-Bera	2.390476	1.381753	2.765721	1.121795
Probability	0.302632	0.501137	0.250860	0.570697
Sum	4282.920	292.6440	8.060000	52.54400
Sum Sq. Dev.	249435.5	394.9616	0.173849	1.136447
Observations	24	24	24	24

Author's E-views 12 Computation

The variables between OPB, OCB and GDPC are closely packed together while the EXCR is well dispersed from the rest in terms of mean, median and standard deviation. The extent of skewness of the variable are closely ranged. The variables OPB and EXCR has kurtosis of approximately 3, which indicates a standard normal distribution known as Mesokurtic while the rest of variables – GDPC and OCB has kurtosis below 3, known as Platykurtic, which is an abnormal distribution curve. The jarque-Bera statistics and probability are all insignificant being greater than the 5% chosen level of significance.

4.1.2 Unit Root Test

Table 4: Unit Root Table

Variable	ADF Statistic	Critical Value @5%	Probability value	Integration
GDPC	-3.4155	-2.9981	0.0210	I(0)
OCB	-5.0017	-3.6450	0.0034	I(1)
OPB	-4.2107	-3.7105	0.0207	I(1)
EXCR	-4.6972	-3.6329	0.0059	I(1)

Author's E-views 12 Computation

The unit root tests predict the extent of stationarity of the variables whether they are stationary and stable to levels or not. Only GDPC was stationary at level with critical value greater than the ADF statistic and highly negative and significant p – value of 0.0210 while the other variables are all stationary at first levels with highly significant probabilities less than the chosen 5% level of significance. We thus, conclude that there is an absence of unit root in the model.

4.1.3 Serial Correlation Tests

Table 5: Breusch – Godfrey Serial Correlation Result

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	1.825533	Prob. F(2,15)	0.1952
Obs*R-squared	4.110885	Prob. Chi-Square(2)	0.1280

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In table 5, with the p – values of F and Chi greater than the chosen 5% level of significance, we conclude that there is no evidence of autocorrelation in the model and among the variables.

4.2 Hypothesis Testing

4.2.1 Ordinary Lest Square Regression

Table 6 – Ordinary Least Square Result

Dependent Variable: GDPC				
Method: Least Squares				
Included observations: 21 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-12.00855	12.75511	-0.941470	0.3597
OCB(-3)	15.13514	17.86396	0.847244	0.4086
OPB	10.21644	4.310411	2.370178	0.0299
EXCR(-1)	-0.016779	0.015208	-1.103315	0.2853

Author's E-views 12 Computation, 2022 [See Appendix 1]

The R^2 with a value of 51.01% and an adjusted R^2 of 42.37% shows that the model has the capacity to accept more variables and displays a goodness of fit. The overall probability of F-statistic of 0.005969 is considered highly significant and a Durbin Watson of approximately 2 (ie 1.461) indicates absence of autocorrelation in the model.

The result from above regression indicates that at a lag of 3, oil consumption in millions per barrel is positive but insignificant. This shows that the distribution system of this product culminating in this consumption by the final users, its outcome though positive in terms of GDP contribution, is however

insignificant, meaning that target distribution objectives are not being achieved. Conversely, the project planning captured by oil production in millions of barrels per day captured by OPB, positively and significantly affects the sector contribution to GDP.

4.2.2 Co-integration Tests

Table 7: Trace Co-integration Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.746134	68.23946	47.85613	0.0002
At most 1 *	0.666748	38.07863	29.79707	0.0045
At most 2	0.456140	13.90377	15.49471	0.0856
At most 3	0.022666	0.504379	3.841465	0.4776
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				

Author's E-views 12 Computation

Table 7, shows that there are two cointegrating vectors [using the trace co-integration test] in the model and we thus conclude that there is a long-term relationship between the exogenous and the endogenous variables of the model in equation 3.

Table 8: Maximum Eigenvalue Co-integration Test

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.746134	30.16083	27.58434	0.0228
At most 1 *	0.666748	24.17485	21.13162	0.0181
At most 2	0.456140	13.39939	14.26460	0.0681
At most 3	0.022666	0.504379	3.841465	0.4776
Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level				

Author's E-views 12 Computation

Similarly, the reconfirmation test using maximum eigenvalue reconfirms the position of the existence of two co-integrating vectors in the model [table 8].

4.3 Discussion of Findings

The research work set out to investigate the relationship and impact that project planning and the distribution system would have on GDP contribution with reference to the Petroleum industry act. Econometric techniques were employed to prepare and test the data, including descriptive statistics, Unit root test and Breusch-Godfrey autocorrelation; all indicate perfect fit and absence of autocorrelation in the model. The regression tests indicate a positive but insignificant impact of distribution matrix captured by

OCB on the contribution to GDP with a p – value of 0.4086. OPB on the other hand, representing the project planning variable showed a positive and significant impact on contribution to GDP with a p – value of 0.0299. We also, document a cointegration between Nigeria's oil production and contributions to GDP as the p-values of the trace and maximum eigenvalue tests for co-integration indicates the existence of two co-integrating vectors each [p – values 0.0002, 0.0045 and 0.0228 and 0.0181 respectively]. This outcome agrees with the findings of Olayungbo and Adediran (2017) of a positive and significant relationship in the relationship between economic growth and oil revenue performance; this is also corroborated by the outcome of Shenhar (2001) of a positive and significant impact of the effect of planning on eventual project success.

The implication of the findings of this research work is that a 1% rise in oil production, will result to a 10.2164% growth in the economic growth contributions in Nigeria. We thus, argue that when the project planning and execution activities and the product distribution process in the Nigeria Petroleum industry is put right, the contribution of these efforts to the gross domestic product (GDP) in Nigeria would be excellent.

5.0 Conclusion and Recommendation

We conclude from our studies on the adoption of effective project planning and distribution matrix in the oil and gas sector in Nigeria, to have a positive and significant contributions to Nigeria GDP with reference to the Nigeria Petroleum industry act, and recommend as follows;

1. The implementation of sound project planning procedures with supportive distribution matrix mechanisms that are thoroughly monitored by tested quality assurance processes in the petroleum sector as a panacea to realizing the gains of the Petroleum industry Act, 2021. This will include having a sound Budgetary system for analyzing and approving oil industry projects and enshrining strong distribution network, fleet and systems, to deliver petroleum products to the end-users [in the downstream of the sector]
2. Attracting quality and committed manpower should form part of the project of the sector, as this will aid the value addition and development process of the industry. There should be adequate host community engagements, to add the local contents to the entire process as these are part of the peculiarities of the PIA.

6.0 References

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Appendix 1

Ordinary Least Square Regression Result

Dependent Variable: GDPC				
Method: Least Squares				
Date: 09/12/22 Time: 02:32				
Sample (adjusted): 2001 2021				
Included observations: 21 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-12.00855	12.75511	-0.941470	0.3597
OCB(-3)	15.13514	17.86396	0.847244	0.4086
OPB	10.21644	4.310411	2.370178	0.0299
EXCR(-1)	-0.016779	0.015208	-1.103315	0.2853
R-squared	0.510102	Mean dependent var		12.22724
Adjusted R-squared	0.423650	S.D. dependent var		3.676575
S.E. of regression	2.791172	Akaike info criterion		5.060444
Sum squared resid	132.4409	Schwarz criterion		5.259400
Log likelihood	-49.13466	Hannan-Quinn criter.		5.103622
F-statistic	5.900374	Durbin-Watson stat		1.460806
Prob(F-statistic)	0.005969			

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