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Detailed Information

Performance Measure on Factors Influencing Production Capacity in the Natural Gas Industry with Comparison to Gas Exporting Countries [GEC]

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Abstract This research seeks to examine the productivity of Nigerian national gas company in comparison with the performance of other gas exporting/producing countries Diamond, DEA and Regression model analysis was used to evaluate factors influencing production capacity of the sample countries [Algeria, Angola, Nigeria, UAE & Qatar] used in this research for comparative analyses, towards enhancing efficiency and performance in terms of production capacity, consumption capacity, net exports/imports, gas facility types and gross domestic product as a process of creating shared value [CSV] of investment opportunities, strengths, weaknesses

and threats as shown around the four angles of diamond model

The approach of this research was modeled in three different concepts

(i) Diamond model was modeled towards sampling out the countries ranking in relation to all the factors used in the research analysis (dependent variable [production capacity] and independent variables [consumption capacity, net export/imports, gas processing facility types and economic growth]) according to Porters diamond model analysis and approach, (2001) and also Porter & Kramer in (2006) & (2011) respectively. (See Table 6 & figure 27.2)

(ii) Efficiency amongst the gas exporting countries (GEC), relative to countries gas producing companies

is measured and captured using DEA (data envelopment analyses) as the process is charted using Malmquist index analysis where efficiency/inefficiency is captured according to Victors , (2007) approach

DEA was used to analyze the performance of NOCs and that of IOCs empirically

using macro-level data and various performance indicators, 25 oil companies was introduced by Victor, (2007)

with regards to his findings, IOCs tended to have higher production to reserves ratio. Eller et al. (2009 & 2010), he applied both DEA and stochastic frontier estimation (SFA) to a panel of 78 firms over three (3) years (2002-2004) to present empirical evidence for the revenue efficiency of NOCs and IOCs. His findings also justifies Victors findings, that NOCs are less efficient than IOCs, and in addition, that much of the inefficiency can be explained by the differences in the structural and institutional features of the firms, which may arise due to different firms objectives.

This recent research findings also validates the findings of the previous literatures (Victor, 2007 & Eller, et. Al 2009-2010)

with more emphasis on gas production capacity and with the view on both gas exporting countries and national gas companies, as such from the DEA scores obtained in this study, the IOGCs were found to be clustered near the frontier, with an average DEA efficiency score of 0.95 to 1.1, while the NOGCs, although dispersed throughout the study, tended to be clustered farther away from the frontier and with a score of 0.28, and the Nigerian National Gas Company (NGC) with a score of 0.25 [in the 4th Quadrant of the Malmquist Index analyses, see figure 29].

(iii) Regression model [panel data analyses] correspondingly review the value chain by analyzing the interdependence of the Oil and Gas industry in relation to gas production capacity and the impact of the value chain with regards to influencing factors (consumption rate/quantity, net exports/imports, gas processing facility types and economic growth) as independent variables. According to Hoff, (2007) regression analyses [panel data estimation] was used as an alternative paradigms for evaluating the economic consequences of production-related decisions with respect to the efficiency/inefficiency of companies. Hoff (2007) claimed that the Tobit and OLS approaches sufficiently represented DEA second-stage analysis in a case study for the Danish fishery. Banker and Natarajan (2008) also argued that OLS yields consistent estimates when the DEA scores are regressed on the variables influences. Simar and Wilson (2011), however, made some observations surrounding the restrictive assumptions underlying the reliance on these proposed methods and the data generating process for DEA second-stage analysis. Barros

and Dieke (2008) measured the economic efficiency of airports and concluded that the second-stage regression proposed by Simar and Wilson (2007) better describes the efficiency scores. These two arguments notwithstanding, using panel data is expected to mitigate the negative concerns and to yield consistent estimates after carrying out the necessary, appropriate statistical tests. [45]As cited in Simar and Wilson (2011)

The steps outlined by Dougherty (2007) were followed in selecting the appropriate panel regression model. In this research analyses the selection of appropriate panel regression model was achieved using Hausman test accordingly. Were observations made in this study are said to be those of diamond model sampling and ranking procedure, from all the gas exporting countries (GEC) used in the diamond model I, which leads to efficiency measurement by using DEA model II. The 23 companies used for DEA analyses, were drawn from the gas exporting countries (GEC), that has similar production tendencies but different operational processes, as well as production capacities and capabilities

and they fairly represent the top and major players in the worlds gas industry. Therefore, the fixed- and random-effects regression models were used. The Durbin-Wu-Hausman test was carried out to discriminate between the two models, and based on its results, the random-effects model III was provisionally selected for this research analyses. (See figure 32 & 33)

The data used in this research analyses was modified into all the three models consequently. Data was collected from the secondary sources largely through the use of electronic medium. Data was also conferred from various articles, journals and publications others include annual reports of International Oil & Gas Companies (IOGCs) operating in Nigeria and globally for genuineness.

The data collected was analyzed using the relevant statistical procedure, the use of coefficient, probability, chi square value, significant, means ( ) statistics, simple ratio and percentages in analyzing the data. Natural gas industry/country data for a span of 15 years [1999 -2014] was analyzed

the data was sourced from Nigerian National Petroleum Corporation [NNPC], in case of Nigeria and other countries data was generated from

IEA, EIA and World Bank data are equally utilize. Similarly

the data used are adapted to fit all the three (3) research models and analysis. (See figure 10)

The result vary among countries, which indicates a significant & insignificant relationship that has influence on the production efficiency of Nigerian national gas company as well as other gas exporting/producing countries [GEC] impacting on their economic growth and development of the gas sector (see figure 35, 36, 37 & 39). The consequences of this research findings can be employed to provide useful implications that can guide governments efforts of providing sound policies, conducive secured business environment and regulatory framework for energy efficiency and sustainable economic growth and development of gas exporters/producers.

The development of the value chain of the gas industry, extremely depends on Policy decisions such as Taxation, Licensing and Petroleum and Gas Contracts, Depletion Policy and Industry Participation

also Companies vertical and horizontal integration choices are affected by country-level industrial policies and the related legal and regulatory frameworks. By creating shared value (CSV) a peaceful and harmonious business environment can be achieved hence, productivity will increased. One of the first steps of creating shared value is for the companies to define their core competence
by doing this they can fully exercise their strength towards value sharing with the society. Secondly government interference, politically or other-wise, should be highly mitigated towards more strategic and systematic approach.
Nigerias attractiveness, when compared to other members of GEC is below average, this is largely due the weak business environment and related insecurity issues and weak or few supporting and related industries in the Nigerian gas sector. Another major factor that is keeping away FDIs is the delay in passing Petroleum Industry Bill (PIB) as a new fiscal framework of the gas industry by the government also contributes grossly to the inefficiency of NNGC, as analyzed using the research models in this study. Nigeria has the largest market size within the sampled countries but nevertheless this size is unable to translate to enhance value creation on the primary artifact, this is evident to non-participation of IOGCs in Midstream and Downstream of the gas sector.
Infrastructural development and Good Governance are the key factors for economic growth in developing countries and also through Bilateral and Multilateral co-operations as well as cohesive collaboration amongst the gas exporting countries/firms (GEC) and consumer countries can reveal great accomplishment.

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