Competitive Analysis of the Global Oil and Gas Industry using Porters Five Forces Model

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1.0 Abstract:

The Structure Conduct Performance (SCP) model suggests that the structure of an industry has more bearing on the performance of firms operating in an industry (Mason, 1939, 1949; Bain, 1951 as cited in Lipczynsk et al 2013, p. 6; Bain 1956; Bain 1968). In view of the SCP model this study investigates the fundamental competitive drivers, that function within the global oil and gas industry -more specifically Exploration and Production (E&P) segment[1]- using Porter's (1979) Five Forces model, the study also attempts to assess the likely impact of these fundamental drivers on the profit potential of the industry. The results showed that, while customers bargaining power appears to be low, the power of suppliers might be of moderate strength and that the threat substitute products is still, far off, and less credible in the short run, it is also observed that the industry has high barriers to entry, Finally, the study revealed that there are both intensive rivalry and evidence for collaboration among existing players in the oil and gas industry.

Key words: Competitive Structure, Oil and Gas Industry, Porter's Five Forces, Profit Potential.

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[1] For the purpose of this study the terms E&P industry and or oil and gas industry shall be used interchangeably to mean the global E&P sector of the industry.

2.0 Introduction:

In agreement with SCP advocates, Barney and Zajac (1994) strongly believed that, the market in which a company operate is a key factor that determine its profitability. If one accept this widely held view, competitive analysis would therefore expected to uncover a set of contextual underpinnings that act to inform companies strategic positioning based on an enlightened view of the external forces operating within the industry, to this, certainly, oil and gas industry is no exception. Caves and Porter (1977) (Porter, 1979; Porter, 2008) have strongly supported this SCP nation.
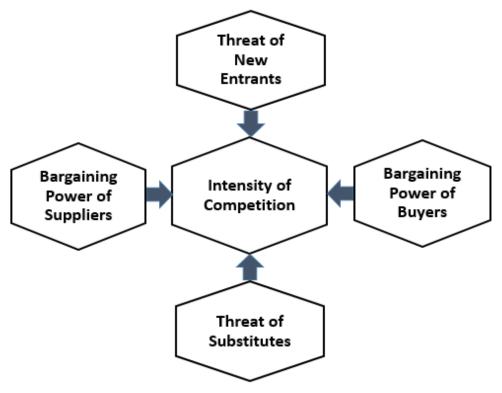
Therefore, this study is set to examine critically the market dynamics within the oil and gas industry and, to assess the profit potential of the industry in light of various competitive drivers.

On the basis of the overall objectives of the study five major issues will be addressed: To begin with, an assessment of whether there are threats of new firms entering the oil and gas industry will be investigated. Secondly, the study will try and review the seriousness of various attempts of substituting petroleum products with other alternative energy sources. Furthermore, is there a threat of buyer's ability to negotiate lower prices? Similarly, are suppliers able to dictate own terms and conditions on oil and gas producers? The intense of rivalry among existing major players in the industry will be examined as well. Essentially, the study will try and highlight likely impact of each of these forces on the oil and gas industry profit potential.

3.0 Research Methodology:

Porter produced his pioneering (1979) Five Forces model to be used for industry structure analysis using five generic factors: Threat of new entrants, threat of substitutes, bargaining power of buyers, bargaining power of suppliers, and intensity of rivalry among existing firms (See figure-1 below).

It worth noting that, after almost three decades, in which the Five Forces model have been used widely by academics and practitioners alike, Porter stated that "Industry structure drives competition and profitability, not whether an industry is emerging or mature, high tech or low tech, regulated or unregulated" (Porter, 2008: 30). This model is still operational as a generic framework for competitive analysis of any industry, thanks to the degree of business image clarity provided by the model across the value chain (Brandenburger, 2002) and, the emphasis that the analysis results can be used for positioning the company in order to gain competitive advantage (Aktouf *et., al*, 2005).

Porter (2008), Harvard Business Review

Figure-01: Competitive Forces that Shape Strategy:

Threat of new entrants' means that there is a risk that new companies could enter the industry and compete with incumbents by gaining some share of the market, which may negatively impact on industry profit potential (Porter, 2008). However, barriers to entry could prevent new entrants from

entering the industry. Barrier to entry includes: high capital requirements (Bain, 1956; Porter, 1979), high sunk costs and experience curve (Porter, 1979).

Porter (1979) rightly pointed out that substitute products as a competitive force has more strategic bearing, and should be taken more seriously in industries that are characterized by high profit rates and or when substitute products are experiencing positive trend in their price-performance ratio.

Bargaining power of suppliers is low when the suppliers' financial viability is dependent on the industry they are serving. The relative size of suppliers and their monopoly power compared to industry clients is another factor to be considered (Grant, 1991).

Similar to bargaining power of buyers, various factors come into play when sizing the bargaining power of suppliers. As identified by Porter (1979) if buyers are organized in groups they could demand lower prices for products or services. Another factor is the size of the buyers and volume of their purchase. The availability of close substitutes and low degree of product differentiation could also make switching from one product to another much easier for buyers, which might increase the bargaining power of customers and hence dilute industry profitability (Peteraf, 1993).

Porter (2008) cited various factors for signaling the degree of rivalry among incumbents, comprising: barriers to exit, high assets specificity and high fixed and snuck costs, this is particularly so when profitability is declining or when firms are making losses. The Degree of commitment of the incumbents and the prevalence of other non-profit making objectives tend to intensify the competition as well.

4.0 Results and Discussion

This section shows the resultant analysis from the application of the underline generic five forces of Porter to the oil and gas industry.

4.1 Threat of new entrants:

Oil and gas industry have various characteristics in regards to barriers to entry. For instance, this industry is highly costly and technical. As presented in figure-2 below, the breakeven price for deep-water Gulf of Mexico oil projects are higher than $60/barrel (U.S. EIA, 2016) whereas, the weighted average crude oil spot price of Brent, Dubai and West Texas Intermediate was $42.8/barrel in 2016 (Index Mundi, 2016). This indicates that given the current state of technology, event some of the most entrenched companies are making losses which could obviously deter aspirants.
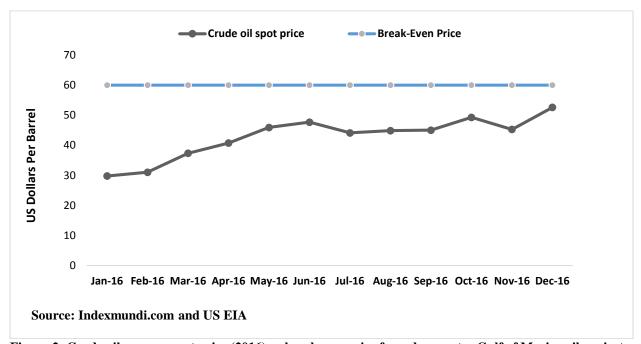

Source: Indexmundi.com and US EIA

Figure-2: Crude oil average spot price (2016) vs breakeven price for a deep-water Gulf of Mexico oil project

In the technical side, the possession of advance technology in the part of existing players can boost productivity while reducing costs (Santos *et al*. 1999 as cited in Hokron, 2014), making it more difficult for new contestants to operate at the same cost curve.

Moreover, for firms to enter into this industry they need to have strong ability to raise funds, which becomes rather difficult, in the presence of substantial sunk costs and high assets specificity

(Worthington, 1995). Another barrier to entry in the extractive oil and gas business is high exit costs. By way of illustration, Campbell and Smith (2013) reported that in the UK it costs around $10 million to plug and abandon a semisubmersible platform. These high exit costs may increase the incumbent commitment to fight, thus, deter the potential entrants from entering the industry.

There are many evidences to suggest that learning curve in oil and gas wells drilling is a source of competitive advantage that is hard to overcome by new entrants (Chi, 1978: and Bondy, 2015). Figure-3, illustrates that while it could take an operator with zero learning up to 20 years to breakeven, it might only take on average 5 years for an experienced operator to do, which is almost 4 folds advantage, this again another entry deterrence factors, emerging from the very unique characteristic of the oil and gas industry.
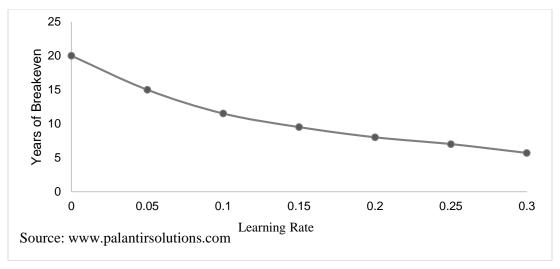

Source: www.palantirsolutions.com

Figure-3: Oil drilling projects breakeven time and learning rate

First move, is another source of competitive advantage that incumbents enjoy over potential rivals. For instance, the majority of the most preferable and lucrative oil and gas fields might have already been occupied by major oil and gas players. Quigley (2014) report implied that these oil majors are holding on these strategic assets quite tightly.

The above mentioned factors represent massive barriers to entry to oil and gas industry, which may limit the pool of likely entrants. Consequently, making it possible for firms already operating in the industry to generate economic profit other things being equal.

4.2 Threat of substitutes:

As depicted in figure-4, the consumption of oil and gas alternative sources, such as wind, solar and geothermal are increasing at an increasing rate over time for the period from 2000- 2015 (BP Statistical Review, 2016). However, their expansion to the degree of significant substitution is faced by various challenges, a possible explanation for this might be that renewable energy production is linked with weather conditions. For example, sun light availability and limited dust are necessary for optimal solar energy production, this make alternative energy sources more of a locational specific.
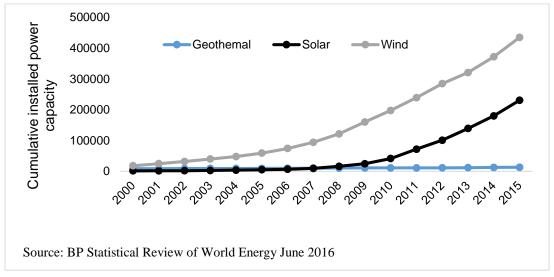

Source: BP Statistical Review of World Energy June 2016

Figure-4: Historical trend of renewable energy sources

Non-hydro renewable electric energy might be cited as another potential substitute product to oil and gas. Davis and Owens (2003) using real options calculated that, the current annual funding for US non-hydro electric energy R&D program was only $300 million, whereas the program requires around $1.2 billion per year. Their study concluded that;

> 'The optimal policy is to delay deploying RE and continue R&D funding until RE technologies become more competitive, which will take about 25 years according to the DCF model' (Davis and Owens, 2003: 18).

This could possibly implies that, the US research and development program for non-hydro renewable electric energy was still in its early stages.

In terms of marketability, Sayigh (1999) claimed that renewable energy products penetration rate of the energy market have beaten expectations, and may represent around 10-15% energy of consumption by the year 2020. Conversely, McVeigh *et. al* (2000) found that these energy source have not been successful in achieving the expected US energy market penetration rate, although their production costs were cheaper than expected. The later point has been supported by Varma (2016), who argued that the price performance-ratio of various substitute products is improving, Nevertheless, switching costs from fossil to non-fossil fuel could be high, since the current machinery were predominately designed to operate on the earlier.

That being said, the challenges of threats of substitute products although highly likely in the longer terms seems to be less credible at least in the short to medium terms.

4.3 Bargaining Power of buyers:

The barraging power of buyers depends to a large extend on the degree to which buyers are concentrated on organized groups. Although buyers of hydrocarbons are generally powerful countries such as the Chinese, American and Japanese governments which imports 18.6%, 15.9% and 7.3% of world crude oil respectively (Workman, 2018), this represents a massive 41% of the global oil market. However, despite their big size, the lack of a unified formation for oil buyers, could possibly, reduce the degree of hassles caused to producers. As pointed in the earlier discussion, the lack of credible substitutes to oil and gas products and the actuality of high switching costs to other alternatives, the bargaining power of customers might be low.

On top of this, the producers of oil and gas are big multinational companies (see table-1), this might at least, expectedly, restrain the ability of buyers to bargain and force prices down.

Table-1: Top 10 Oil and Gas Producers

Company	2017 Revenue in $billion (as a proxy of size)	Nationality
Saudi Aramco	455	Saudi Arabia
Sinopec	488	China
China National Petroleum	428	China
ExxonMobil	268	USA
Royal Dutch Shell	265	Netherlands/UK
Kuwait Petroleum Corporation	251	Kuwait
Eni	131	Italy
Chevron Corporation	129	USA
BP	222	UK
Total	212	France

Adapted from (Oil & Gas IQ.com)

But, sellers' ability to charge higher prices could still be low, because all products are homogenous with slight quality variations. Nevertheless, a group of the largest sellers of crude oil have organized themselves into the 'Organization of the Petroleum Exporting Countries' (OPEC), which could again weight down the ability of buyers to negotiate lower prices, and at the same time enable OPEC members to limit the chances of price collapse, primarily, through the determination of production quota. However, Dichristopher (2016) pointed out that OPEC members fight for market share among themselves, which is expected behaviour in any cartel, because there is tendency from some members to maximize own interests at the expenses of other members.

It follows then, neither buyers nor sellers have sufficient bargaining power to be forced upon each other. Overall, the prices of products sold by firms operating in this industry can be claimed to be largely determined by the interplay of supply and demand.

4.4 Bargaining Power of Supplier:

In the oil and gas industry some supplier are well established firms such as Schlumberger, Weatherford International, or China Oilfield Services Ltd, which suggests an ability to bargain. In a recent study Naumov and Toews (2016) found a strong relationship between oil prices and upstream capital costs (See figure-5).
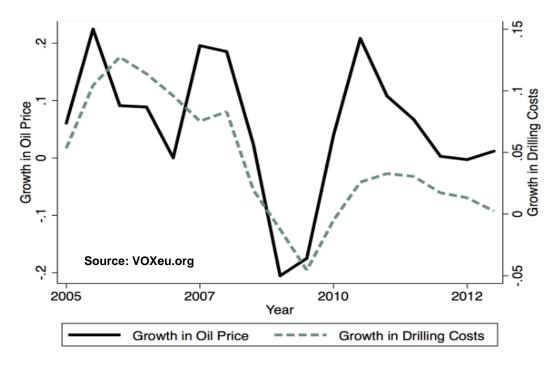

Figure-5: Growth in three-year moving average of the real oil price and drilling costs (2005-2012)

The positive correlation between growth in oil prices and growth in drilling costs over the period from (2005 to 2012) could indicate that oil and gas service companies are very flexible, as they adjust their costing system to match oil prices fluctuations. This entails suppliers' ability to negotiate higher prices when economic conditions are good. On the other hand, and despite the high E&Ps dependence on their suppliers for execution of key operational activities across the oil and gas value chain, services companies are forced to lower their prices, in the environment of low oil prices (Marcel, *et al*. 2016). Further, Marcel *et al*. (2016) claimed that having their margin squeezed, the services companies are forced to move towards more integrative, collaborative and
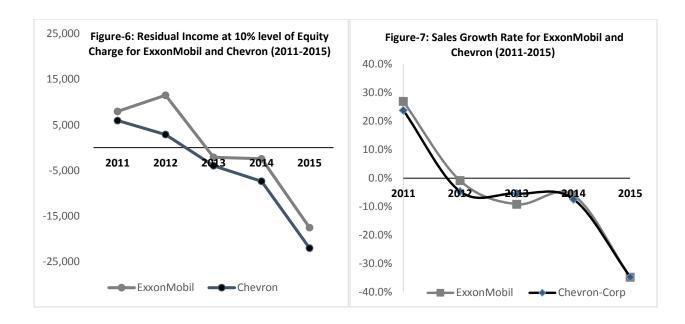
partnership operational models with their clients, sharing both risks and rewards with E&Ps, which means oil and gas companies are giving up part of the industry profit to top suppliers.

On balance, the bargaining power of suppliers is not strong to the degree that it affects firms' performance in a significant way. Nevertheless, the new trend of supplier-client partnership operational model may means that part of the profit pie might cross the E&P industry boundaries.

4.5 Intensity of competition:

There are some evidences to suggest that rivalry in the oil and gas industry is very intensive, because the incentives to fight are rather high. By way of exmaple, Quigley (2014) reported that, in 2012 the Chinese oil giant Sinopec have facilitated an extension of $7.5 billion credit line to Angola in which it was producing more than 1.7 million barrels per day with projection to reach 2.0 million barrel per day starting 2014. In the same year Sinopec have paid $2.5 billion to acquire 20% of OML 138 field in Nigeria. These are multibillion dollar projects, with huge future cash flow expectations, which have clearly incentivize Sinopec to try and cement its presence in West African region. Let alone other political motives for these multi-nationals.

It is also observed, the industry sales and residual income are very sensitive to economic situation. As demonstrated in figure (6 and 7) below, ExxonMobil and Chevron sales growth rate and residual income are negative for the period from (2013-2015). The negative growth in sales volume and the inability to generate economic rent by major players such as these, coupled with the high sunk costs and exist barriers in the industry- see section 4.1- represents entry barriers, but may also signal a pre-commitment strategy, therefore, leading firms to compete more fiercely to recover these costs, in a somewhat harsh economic environment.

Figure-6: Residual Income at 10% level of Equity Charge for ExxonMobil and Chevron (2011-2015)

Figure-7: Sales Growth Rate for ExxonMobil and Chevron (2011-2015)

However, Hokron (2014) and Brogan *et. al* (2015) reported that oil and gas companies have various reasons to collaborate and operate jointly, in the form of joint venture for instance, this collaboration is driven by desire to share risks, get access to capital and technological capabilities and gain more market power.

Although, there is intense competition among rivals in the oil and gas industry, which might not be good for the industry profitability, there is tendency for oil and gas giants to collude, may somehow dilute the adverse effect of zero sum competition.

Conclusion:

The competitive analysis of the oil and gas industry has revealed that; this industry is hard to enter, possibly because of high capital requirement, high sunk costs and incumbents competitive advantage. Substitutes products started to penetrate the energy market with an increasing rate, but might only affect profitability of the industry in the distant future. The barraging power of buyers seems to be limited, primarily due to the relatively big size of producers and the organization of them in a cartel, and the fact that buyers are not organized in groups. Suppliers' bargaining power

seems to be moderate, although there are evidences of high dependence on them by E&P companies, thus posing some risk on industry profitability. The study found signs of intensive rivalry among existing players, because there are political interests and the desire to protect and control of rich oil and gas assets, yet there is scope for collaboration driven by (high risk-high costs) nature of the oil and gas business. Finally, although, most oil majors are making accounting profit, the economic profit was negative for some of these companies at least in the last 3 to 5 years.

Despite the insights provided by Porter's 5-Forces model about the oil and gas industry competitive landscape, the analysis ignores the characteristics of individual firms operating in the industry, a limitation inherited from the model used. In reality, however, along with market structure what equally matters for companies' success is the possession of distinctive capabilities that help in creating and sustaining competitive advantage Wernerfel (1948).

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