



**The Effects of Vertical Integration  
On Oil Company Performance**

**By**  
KAMRAN ROSHAN  
SAP Id. 500064787

**Guided By**  
Mr. N.SHANKAR G.M(CHEMISTRY),  
ONGC, KARAIKAL

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# Oil & Natural Gas Corporation Ltd

Cauvery Asset, Neravy Complex

Karaikal – 609 604

Office of GM (Chemistry)  
LM – Drilling Fluid Services

Phone: 04368- 235328

Fax: 04368- 238126

No: KKL/CA/DFS/Dissertation Guide/EMBA/2019-20

Date : 06.08.2019

From,

**Shri. N. SANKAR, GM (Chemistry),**

I/C – Tech. Support & Planning Manager.

Drilling fluid services. ONGC, Cauvery Asset.

Neravy Office Complex, Neravy, Karaikal – 609604.

Ph: 04368 235332, Mob: 9443002841.

**Email:** [n.sankar@ongc.co.in](mailto:n.sankar@ongc.co.in)

**Sub:** Willingness for Guiding Dissertation of Mr. Kamran Roshan, Sr. Chemist,  
Registration No. 500064787

Dear Sir,

**Mr. Kamran Roshan, Senior Chemist, Drilling Fluid Services, ONGC, Karaikal** is registered for (MBA Oil & Gas) with the University of Petroleum & Energy Studies, Dehradun in **October-2017** batch.

I hereby give my acceptance to guide the above student through the Dissertation Work on **“The Effects of Vertical Integration on Oil Company Performance”**, which is a mandatory requirement for the award of EMBA degree.

Thanking You.

  
Yours Sincerely,

**एन.शंकर /N. SANKAR**  
महाप्रबंधक(रसायन)/GM(CHEM)  
वैद्यन द्रव्य सेवाएं,ओ.एन.जी.सी./DFS,ONGC  
कावेरी परिसर, कारैकाल/Cauvery Asset, Karaikal

# CERTIFICATE

This is to certify that the dissertation report on “**The Effects of Vertical Integration On Oil Company Performance**” completed and submitted by kamran roshan in partial fulfillment of the requirements for the award of degree of Masters of Business Administration (Oil and Gas Management), is a bonafide work carried out by him under my supervision and guidance.

To the best of my knowledge and belief the work has been based on investigation made, data collected and analyzed by him and this work has not been submitted anywhere else for any other University or Institution for the award of any degree/diploma.

  
Yours Sincerely,

**एन.शंकर /N. SANKAR**  
महाप्रबंधक/रसायन /GM(CHEM)  
वेवन इन् वेवारे,ओएनजीसी /DS (ONGL)  
कावेरी परिसरवि, कारिकाल /Cauvery Asset, Karaikal

N. Shankar GM (chemistry)

ONGC, Cauvery Asset,

Neravy karaikal

## DECLARATION

This dissertation report is entirely my own work. It has not been submitted in any previous application for a degree. All quotations in the report have been distinguished by quotation marks, and the sources of information specifically acknowledged.

Signed:



Kamran Roshan

Sr. chemist ONGC Cauvery asset Karaikal

Sap id:500064787

Student of MBA (Oil and Gas Management)

UPES Dehradun

30/Aug/19

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*Action springs not from thought, but from a readiness for responsibility.*

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I hope with all your best wishes and blessings i deliver my best to any responsibility assigned.

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## **Chapter 1**

### **INTRODUCTION**

When asked to rank industries by their degree of vertical integration, most people would agree that the oil industry should come top of the list. Underlying this belief is the fact that integration and size tend to be closely associated. As the oil industry is so large and oil companies so visible and perceived as so profitable, the common belief is a correlation between vertical integration, size and performance. If a dynamic view is taken of this cross-sectional observation we would expect to find an oil industry populated only by fully integrated very large companies. However, a closer look at the industry shows a large dispersion in the segments in which companies participate, and even companies in the same segments use the market in different degrees.

Furthermore, the average degree of integration of the industry does not exhibit a specific trend over time. The only periods when trends are seen are periods of either large uncertainty (the interwar periods) or large market power (the period of existence of the Standard Oil Trust). Although the public and the government agencies may have a view of the large advantages of integration, the surprising fact is that many empirical studies do not focus on its costs. The observation of dispersion and stability of integration would suggest, as theoretical studies do, that cost-benefit analysis of integration is needed. This study uses that driving hypothesis and tests for the costs and benefits of integration.

The measure of costs of integration should reflect the effects of slack, diseconomies of size and diseconomies of diversification. The obvious choice is a measure of efficiency, namely technical efficiency that looks at waste assuming inputs are used in the right proportion. The advantages of integration are traditionally set in terms of reliable supply of inputs or reliable demand for outputs. As the existence of uncertainty is a feature of oil markets, a test of uncertainty is made in the form of variability of efficiency. The use of efficiency in both tests is made for the purpose of consistency and is incorporated in the same econometric framework.

The cost-benefit analysis would suggest that each company pursues integration up to the point where its benefits are outweighed by its costs. The results in this paper confirm just that: vertical integration reduces the level of efficiency of companies while it also reduces its variability. In other words, there are diseconomies of diversification but the market also incorporates inefficient volatility. However, the results are not impervious to change, there are periods when the inefficiency associated with integration is smaller as is also the risk-reducing ability of the strategy. This may help to explain the reasons why different degrees of integration may be optimal.

## Chapter 2

# Understanding Vertical Integration

### What Is Vertical Integration

Vertical integration is a strategy whereby a company owns or controls its suppliers, distributors, or retail locations to control its value or supply chain. Vertical integration benefits companies by allowing them to control the process, reduce costs, and improve efficiencies. However, vertical integration has its disadvantages, including the significant amounts of capital investment required.

Vertical integration occurs when a company assumes control over several of the production steps involved in the creation of its product or service in a particular market. In other words, vertical integration involves purchasing a part of the production or sales process that was previously outsourced to have it done in-house. Typically, a company's supply chain or sales process begins with the purchase of raw materials from a supplier and ends with selling the final product to the customer.

Companies can integrate by purchasing their suppliers to reduce the costs of manufacturing. Companies can also invest in the retail or sales end of the process by opening physical locations as well as service centers for the after-sales process. Controlling the distribution process is another common vertical integration strategy, meaning companies control the warehousing and delivery of their products.

- Vertical integration is when a company owns or controls its suppliers, distributors, or retail locations to control its value or supply chain.
- Vertical integration benefits companies by allowing them to control the process, reduce costs, and improve efficiencies.
- Backward integration is when a company expands backward on the production path into manufacturing.
- Forward integration is when companies control the direct distribution or supply of their products.

### Effects of integration

The reasons for vertical integration have been studied from at least three different perspectives: the

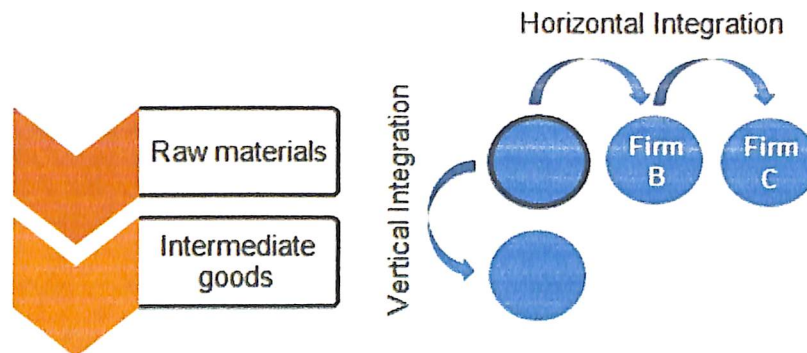


neoclassical theory of the firm, the theory of contracts, and the theory of markets. All three Approaches have identified reasons and possible results deriving from the decision to integrate. However, a casual look at the integration strategies of different industries, even different Companies in a narrowly defined industry, shows a large dispersion in the degree of integration. This observation suggests that the way to approach the issue of integration is by means of Analyzing its costs and benefits.

## Difference between vertical and Horizontal integrations

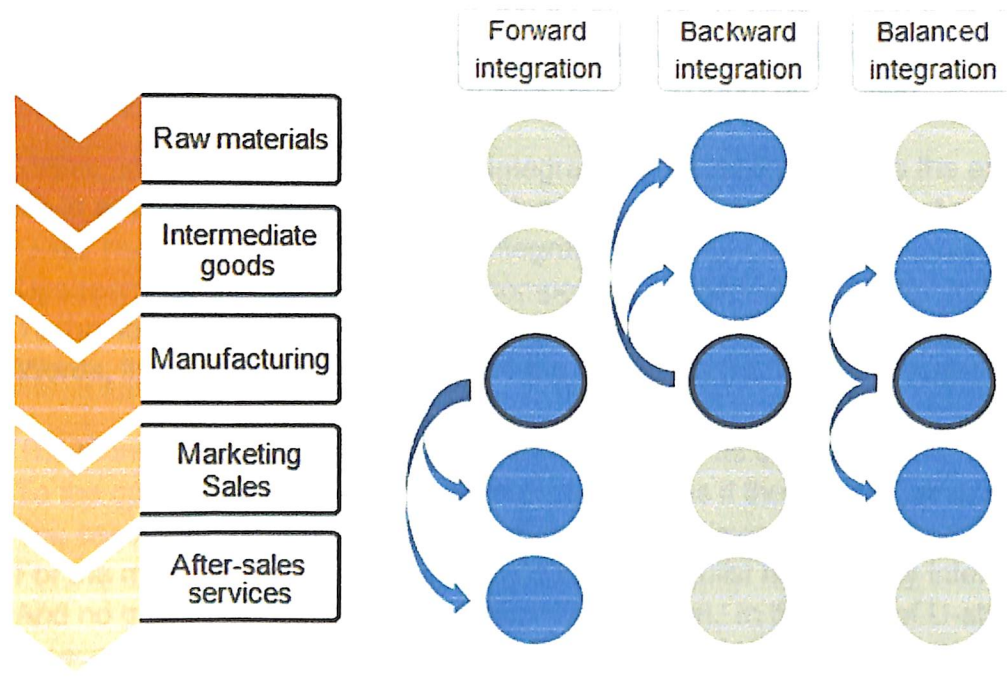
Vertical Integration is different from horizontal integration, where a corporate usually acquires or mergers with a competitor in a same industry.

An example of horizontal integration would be a company competing in raw materials industry and buying another company in the same industry rather than trying to expand to intermediate goods industry.



# Types of vertical integration

Firms can pursue forward, backward or balanced Vertical Integration strategies



## **Advantages of Integration**

This section looks at the economies derived from vertical integration at the firm level.

Vertical integration may arise out of technological economies. In other words, less inputs may be required to produce a given output in the downstream process if the firm is also engaged in the upstream process. Technological economies arise because of the nature of the product and are regarded as a sine qua non requirement to integrate. Consequently, if the efficiency gains derived from integration is too large the scope for strategic behavior using integration as the decision variable is very narrow. Technological economies mean that the efficiency frontier of the downstream process is larger with integration into input production.

Within an industry, the reasons for integration are closely linked to the exercise of market power, or to any other market-related imperfection. Imperfect competition at a given stage of production gives rise to several incentives to integrate vertically. The textbook example is the case of an upstream monopolist faced with a competitive industry downstream. In the case of variable-input technology the competitive segment is substituting away from the monopolist's output. In other words, the competitive industry uses too little of the monopolist's output. By integrating forward.

The monopolist can convert that efficiency loss into its own profit and therefore expand input use to the optimal level. However, this case only arises if the input is used in variable proportions. In the case of fixed proportions final demand for the downstream output is identical to the demand for the monopolist output. In that case, the monopolist has already internalized the efficiency gain, and no gains can be realized by forward integration.' In the case of U-shaped average cost curves a second related reason for forward integration by producers is the separation of downstream markets for the purpose of price discrimination.

Industries, one facing an inelastic and the other an elastic product demand. Although the manufacturer could integrate forward in both markets and thus internalize the efficiency gain by contracting input use in the former and expanding it in the latter, the same result could be achieved by integrating only into the market with the elastic demand. The desired price rise in the inelastic market is achieved by contracting sales to the market while increasing input use in the elastic segment. This would again lead to internalized efficiency gains.' The efficiency incentive for backward integration by a monopolist supplied by a competitive industry upstream can also be made. Without integration the high supply price leads to too little input employment. By the same reasoning above, vertical integration allows the monopolist to appropriate the efficiency gain.

The possibility that vertical integration may lead to barriers to entry and therefore excess profits has been known since the work of Bain (1956). By integrating into an additional stage of production, the producer has raised the capital requirements to entrants. The reason is that profitable entry can only occur by investing in entry in more than one stage. Similarly, a firm may raise its rivals' costs by vertical integration; leaving the market thin and thus restricting the expansion of competitors (Waterson (1993)).

These arguments for vertical integration and the resulting increases in efficiency may seem odd to people in business. In fact, the argument most widely made by industry concerning the advantages of integration is security of supply, for backward integration, and security of markets, for forward integration. This argument cannot be related to random shocks that affect the security of supply or markets for all companies identically. For the avoidance of the randomness, were it possible, is not an advantage as it would lead to the loss of important information and therefore to efficiency losses. The security argument rather, may refer to the situations in which the firm finds itself unable either to sell its output or buy its input. That is situations in which as a result of imperfections the market is not clearing and reliance on its use carries a cost.

The losses arising from using the market are related to the imperfect information and transaction costs. The pioneering article on information is Arrow's (1975). His model incorporates randomness in the output of the upstream industry although its constituent firms have information on output one period in advance. This information, which is highly valuable because capital decisions must be made in the period preceding production, can be internalized by the downstream companies by backward integration. Thus, backward integration enables the manufacturer to make a better prediction of the input price and, therefore, a more profitable investment decision.

In a similar vein, agency problems can be overcome by outright vertical integration as in the models of Crocker (1983) and Riordan and Sappington (1987). As in Arrow's model the incentive to integrate in these two models arises because important information may (but this is not guaranteed) be revealed by integration. Furthermore, agency problems may still persist because delegation within the company will be necessary after it enters a new stage.

The previous paragraphs have discussed motivations for integration arising from market imperfections. However, perhaps the most popular explanation of vertical integration is that derived from the cost of transactions. The reasons for this popularity are its intuitive appeal and the clear testable propositions arising from the theory. The following lines cannot give full justice to such a rich analysis but we will try to summarize the main thrust of the approach.

Transaction costs do not arise from some market imperfection, but mainly from what Williamson

**Calls asset-specificity. The idea is that when deciding to engage in a market transaction the Industry may be competitive ex-ante, but once the decision has been taken specific investments Are made which have effectively locked both parties into a bilateral monopoly situation.**

**As a result the intermediate input market for the two firms cannot be said to exist (Perry (1989)). The Lack of alternatives arises, for example, when there are economies of scale relative to industry Demand in both upstream and downstream markets. Williamson (1975) has identified how asset Specificity may arise from five different types of investments: (1) investment in specific physical Capital, (2) in specific human capital, (3) in site-specific capital, (4) in dedicated capital, and (5) Investment in brand name capital.**

**When the environment is uncertain the transaction costs of writing and enforcing contracts make it prohibitively costly to devise long-term contracts which specify all obligations under all contingencies. The bilateral relations fail to define the terms of performance under all states of nature and the scope for opportunistic behavior in uncertain situations increases.**

**Thus far, the models reviewed here highlight the benefits derived from integration in the form of increased profits. However, if only these considerations were important we would expect the firm To increase its size without bound.**

## **Costs of Integration**

**If firms are equally sized in a specific-stage of the industry, then the addition of one stage of Production will result in a correlation between size and integration. Similarly in a more dynamic Model, if the advantages of integration outweigh its costs, we would expect highly integrated Firms to grow large. Against the idea of a positive correlation between size and integration is Stigler's (1951) argument that young industries tend to be characterized by high degrees of Integration as the division of labour is limited. Industries will initially be oligopolistic in their early Stages of development and as they expand may become more competitive as the division of labour Correlates with the size of the market.**

**However, at some point in time the decision to integrate will lead to the production by the firm Of inputs hitherto purchased from outside. There may then be costs associated with the Organization of production within a firm. Other things given, the greater the number of factors of Production, the greater are the costs associated with either growing or entering a new segment Of the industry. Although Williamson (1974) points to factors limiting the efficiency of markets, He also recognizes the limits to size imposed by the diseconomies of firm scale. A very important Component of the costs of growing large is linked to managerial diseconomies. This arises, Because managerial ability is a scarce resource and because the greater the number of assets under the manager's control the greater the rate at which he must make decisions or the more decision making he must delegate .Related to the problem of managerial diseconomies is that of**

control. As the firm integrates the complexity and the degree of differentiation of its structure increases. As a result the need to monitor different stages of production also increases with the ensuing demands on the top hierarchical management tier. Thus, control is not only a matter of size, but may have a prominent role to play in coordinating new stages because of the non-specialization of production.

The acquisition of new knowledge may prove to be expensive and the more so the more stage-specific knowledge is. Thus, the costs of coordinating stages are inversely related to the similarity of Processes and the possibility to share innovations whether diseconomies of production are related to size or stages of production, the problems of agency still arise. In other words, while the uncertainty models reviewed above highlighted how information can be acquired by means of vertical merger, integration in fact generates employee specific information and growing delegation. Agency theory points out that transaction costs do not simply disappear when hierarchy is chosen over the market. As a result agent's rather than Supplier's (or buyer's) opportunism may arise.

To conclude, it seems that firms will decide to integrate for reasons related to the market structure, the characteristics of technology, the stage of maturity of the industry, and firm-specific factors. Given that integration involves both benefits and costs the decision may turn out to be firm-specific even within the same industry and will be carried out up to the point at which its costs outweigh its benefits.

The scope of empirical analysis in this field is very wide given the diversity of cases and the possibilities that vertical integration may bring about. The following chapter analyses the existing empirical evidence with particular attention to the case of the oil industry.

## **Chapter 3**

# **Vertical Integration and the International Oil OIL INDUSTRY**

The vertical integration of the international oil companies has long been a subject of interest to economists. More recently, interest in the issue has been revived.

As the result of two developments – oil company mergers and national oil company restructuring. However, much of the emerging discussion is based upon a fundamental conceptual error regarding the nature of vertical integration

The first development reviving interest in vertical integration has been the spate of mega-mergers starting with BP-Mobil's downstream venture in Europe in 1996 and culminating with a rash of very large scale mergers during 1998-99. A major driver of these mergers has been the relatively poor performance of parts of the value chain most notably refining. Refineries in general (there are niche exceptions) seem congenitally incapable of earning an acceptable return on a regular basis. Over-capacity and the underlying economics of refining with its high fixed costs force greater throughput and hence cut-throat competition to move the greater volume of products. As the mergers have been approved by the relevant authorities, so the new entities are addressing their portfolio of assets and beginning a process of divestment of lesser performing assets to try desperately to increase overall financial performance in a mature (declining?) industry. This process is giving rise to questions from both inside and outside the companies as to the shape of oil companies and their vertically integrated nature. Many are even questioning whether owning refineries an integral part of the value chain.

The second development which has revived interest in vertical integration is the recent tendency to evaluate and restructure national oil companies. Beginning in the 1980s a number of national oil companies, led by Venezuela and Kuwait, began to acquire downstream assets from the majors who were trying to rationalize their asset portfolio by divesting poor performing assets; a process in many ways similar to the current developments described above. This acquisition has been on a relatively significant scale. For example, Venezuela is now the largest gasoline retailer in the United States. The official reasons for this move to vertical integration included locking-in market share and generating investment income. However, an equally plausible explanation was to deepen the information asymmetries at the heart of the principal-agent relationship thereby enabling greater rent capture by the national oil company. Operating abroad makes it much easier to disguise what is going on from the relevant ministry. It is the growing realization by host governments of this threat

which has prompted an increasing number to scrutinize the behaviour of their national oil companies, in particular in relation to this vertically integrated structure

In this context of renewed interest in vertical integration in the oil industry a serious analytical error is creeping into

Both the academic literature and the trade press. It is a classic example of the sort of error to which economists are prone when they seek to apply the contents of their intellectual tool bags with a complete disregard of the facts of the case to which they apply the concepts. Unfortunately, study of the oil industry has been especially prone to this sort of error, the most spectacular example being the huge literature spawned by the ideas of Harold Hotelling.

The major private oil companies, before the second oil shock of 1979-81, were financially and operationally vertically integrated. Several factors explain. Crude markets were characterized by a small number of transactions and poor transparency. Most crude flowed on an inter-affiliate basis hence there were few arm's length players and few arm's length transactions. Furthermore, the details of the relatively few transactions which took place were closely guarded commercial secrets. The markets lacked transparency. The result was inefficient markets which meant their use involved very high transactions costs compared to inter-affiliate transfers. Security of throughput was crucial to profitability given very high fixed costs at all stages in the industry. The best way to achieve such security in the face of inefficient markets and the weakness of long term contracts in an uncertain world was operational vertical integration. This created a self-feeding circle. Inefficient markets led to higher transactions costs which encouraged ever greater operational vertical integration. This reduced the number of players and market transparency thereby reducing efficiency and increasing transactions costs.

However, this was only part of the story. Operational vertical integration also generated a number of other benefits for the companies. Of key importance was that it inhibited competition. In theory at least, if enough oil companies were operationally vertically integrated, this created significant barriers to entry. If the companies only exchanged crude between their affiliates, there was no access to crude for third parties. Entrants had to enter at all stages in the value chain or not at all. Also, it was possible to practise price discrimination by integrating into the low priced market preventing arbitrage. Operational vertical integration also enabled the companies to play lots of tax games through the use of transfer prices to minimize their global tax bill. In the 1950s and 1960s many West European refineries posted financial losses yet the companies were building them as fast as possible.

After the second oil shock of 1979-81, the world changed and the private companies moved away from operational vertical integration preferring instead to use markets. This increasing reflected several factors. The nationalizations of the 1970s plus the discrediting of long term contracts during



the panic of the second oil shock increased the number of arm's length transactions which meant a greater number of buyers and sellers and greater market transparency. This only occurred after the second oil shock because despite the nationalizations of the first half of the 1970's (which de jure dispossessed the companies of much of their crude producing affiliates), producer governments left the oil companies responsible for crude disposal.

The consequent lowering of transactions costs encouraged the further use of markets which created a self-feeding process of more players and transparency. Greater transparency was also strongly reinforced by the development of forward and futures markets coupled with the information Technology revolution. Amazingly but technically correct, it was not until futures trading began that we had a real statistical oil price record of actual transactions rather than the (albeit informed) guesses of analysts and price reporting agencies. Even in the days of government official selling prices, an ability to manipulate terms disguised true transactions prices.

Other factors reinforced the private companies' moves away from the use of operational vertical integration. Barriers to entry weakened as new un-integrated crude producers entered the market in the 1980s and as the majors began to selloff refineries to smaller entrepreneurs. In such a world, constraint of competition became less relevant because of its unattainability and the greater number of players reinforced the growing efficiency of the markets. Finally, the tax authorities began to constrain oil companies' ability to play transfer pricing games.

The overall result was that operational vertical integration among the private companies, except in certain specific cases disappeared. For example, a refinery affiliate at the end of a pipeline affiliate was still likely to lift its crude on an inter-affiliate basis. However, the national oil companies which had developed a financial vertically integrated capability used operational vertical integration rather than markets. Several explanations are relevant. If locking-in volume was the prime motive then this required the refinery affiliate to lift from the crude producing affiliate. In addition, many in the national oil companies simply did not understand the distinction between financial and operational vertical integration. They simply assumed that private oil companies continued to use operational vertical integration because "this is what oil companies do, isn't it". Finally, inter-affiliate transaction paperwork is arguably easier to fog than an arm's length contract thereby helping to maintain the information asymmetries.

With this background in mind, does the neglect of this distinction between financial and operational vertical integration matter? It does so for several reasons. Potentially, it invalidates the study of vertical integration in the oil industry on either a time series or a cross section basis. In a time series study, comparing levels of "vertical integration" today with say the 1970s is quite misleading. The companies which were "vertically integrated" in the 1970s, today, while appearing to be the same, in reality are only financially vertically integrated. The comparison is meaningless. Similarly, a cross section study is in danger of assuming that companies which are operationally vertically

integrated are comparable with those which appear to be “vertically integrated” but in fact use markets and not inter affiliate transactions. Again any such comparison is quite meaningless.

The distinction is also important because it disguises key issue for the future. Will companies which are financially vertically integrated use inter-affiliate transfers or markets?

An issue which will have significant implications for the future efficiency of oil markets. For example, if national oil companies continue to increase their downstream capabilities and prefer operational vertical integration, will this reduce the number of players and transactions? If so and if market efficiency begins to suffer, might this persuade financially vertical integrated companies now using markets to revert to inter-affiliate transfers? A process which would further inhibit market efficiency. A similar process might be reinforced if there is any tendency to revert to the use of long-term sales contracts. Would this reduced market efficiency in turn have implications for concentration and competition at different stages of the industry? Alternatively, would the

Development of paper barrel markets counter any reduced efficiency from fewer wet barrel transactions?

The distinction also helps illuminate questions over the future of financial vertical integration. Since companies initially developed financial vertical integration primarily to allow operational vertical integration, will a growing use of markets invalidate its continuation? What will encourage greater or lesser use of financial vertical integration? Are we moving to a world where large international oil companies need not own refineries any more than they do not own drilling rigs or seismic teams? All these issues and more arise once the distinction is made between financial and operational vertical integration. The distinction is more than mere academic pedantry.

## Chapter 4

### MEASURES OF VERTICAL INTEGRATION

A firm can be defined as vertically integrated if it encompasses two single production processes in which either: (1) the entire output of the "upstream" process is employed as part or all the quantity of one intermediate input into the "downstream" process, or (2) the entire quantity of one intermediate input into the "downstream" process is obtained from part or all of the output of the "upstream" process.

The definition implies contiguous stages (i.e. no intermediate processing) and the elimination of market exchanges. In addition to these features, the internal transactions refer to physical and not monetary values. The ideal measure of vertical integration should fulfill these requirements. Ideally one would like to construct a single measure of integration that encapsulates every stage of the industry, but this would presumably lead to a loss of information (Martin (1986)). With the data available in this study two distinct single measures of integration could be constructed. One measure enumerates the different stages of production in which the firm is involved, and would classify companies accordingly. A second measure uses Adelman's (1955) ratio of value added to sales. However, it is well known that this measure is not symmetric according to the stage of production, being greater for stages closer to the upstream. Furthermore, due to its inherent correlation with profitability and efficiency, the measure has little empirical value in a study like the one pursued here.

Consider the whole petroleum activity as a process taking crude oil all the way to the final consumer. The activity can be represented by:

**P → T" → R → TP → M → C**

Where P is exploration and production of crude, T" is transportation of crude in either barges, Tankers or by pipeline, R is the refining of the crude and what will constitute the fulcrum of the industry. TP is transportation of refined products, and M is the marketing of refined products, while C is consumption. Taking R as the core of the industry all measures of vertical integration used in this study are constructed around the refining activity.

Vertical integration is by definition the undertaking of activities at more than one stage of the production process. Whether a firm decides to enter one stage or not usually depends on whether the firm chooses to obviate the market. This definition of integration derives from that of the firm

As a collection of activities aimed at bypassing the market (Coase (1937)). In line with this Definition, adopted by most analysts, our measures of vertical integration will refer to activities At each of the four stages (i.e. P, R, M and T=T"+TP). The variables at each stage will be: (1) Production, thousand barrels produced per day; (2) transportation of crude, transportation by Pipeline as data is only available in a meaningful form for this means of transport which, anyhow, Constitutes more than 50 per cent of the amount of crude transported in the USA during the period) (3) refining, refinery runs, which is a measure of the amount of transactions the firm has chosen to involve in rather than those it could involve itself in (the latter represented by refining capacity, sometimes used as a measure in this context); (4) transportation of products, only refers to pipelines (5) finally, marketing is the number of barrels sold per day (a measure of wholesale not retail sales).

In line with the definition of integration and the definition of refining as the core of the business The measures proposed are:

1-. A measure of integration between production and refining defined as:

$$IPR_{it} = \left| P_{it} / (R_{it} + P_{it}) - 0.5 \right|$$

Where P is crude and NGL production for firm i in period t, and R is refinery runs. The first term In the absolute value operator is bound between 0 and 1, where 0 refers to a firm engaged only In refining, and 1 to a firm engaged only in production. A value of 0.5 refers to a firm in both Refining and production that uses the market neither for selling nor buying its input. By giving Equal weight to both activities a firm selling, say 90 per cent of its input, is presumed to be as Integrated as one buying 90 per cent. The use of the absolute value operator and the subtraction

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integrated oil company. The reason for the additional correction to the ratio is to incorporate companies involved in only one of the production stages (i.e. only refining or only producing). Our measure is different from the normally used backward measure of integration (self-sufficiency ratio: the ratio between production and either refinery runs or refining capacity) as we want to give equal weight to backward and forward integration

2-. The second measure of integration takes into account the marketing of oil products by the company and is expressed as:

$$IRM_{it} = \left| \frac{M_{it}}{M_{it} + R_{it}} - 0.5 \right|,$$

Where M is barrels of petroleum product sold by the refiner. The comments made in the previous Paragraph apply to this measure but the sample here consists of refiners or marketers only. This is a measure of integration between refining and marketing.

3-. The third and fourth measures of integration relate to transportation. Barrels of crude oil and Petroleum products transported by pipeline are used to build measures of integration between Refining and crude and products transportation:

$$ICTR_{it} = \left| \frac{T_{it}^c}{T_{it}^c + R_{it}} - 0.5 \right|; \quad IRPT_{it} = \left| \frac{T_{it}^p}{T_{it}^p + R_{it}} - 0.5 \right|$$

Where T and Tp are barrels of crude and product transported by pipeline.

The measures of integration are computed for all the firms in the sample. The data for production, Refinery runs and products sold by refiners come from company reports, Financial Times Oil and Gas International Yearbook (1976-1994), and various issues of the Oil and Gas Journal (OGJ 300,400). the data used to construct the integration measures in transportation comes from the report Oil and Gas Journal (Pipeline Economics) which identifies the amounts of crude and products transported by pipeline. However, pipelines are jointly owned by companies in the sample, so the ownership structure of the pipelines was traced and the volume transported was divided on a pro-rata basis.

Our measures of integration focus on the use or avoidance of the market and not on some financial

or monetary criteria. One advantage of these is that they are based on clearly defined stages where successive and separate production activities are observed. Furthermore, physical measures allow us to compare integration between stages in a distinctly clear manner. The disadvantages arise from the treatment of spot markets trade in the same way as any other type of trade contracts. This distinction is particularly critical for the measure of integration into marketing. We have implicitly assumed that the refiner only integrates into wholesale distribution without further integration into retailing where the issue of moral hazard is particularly interesting and where some of the more recent instances of de-integration have been observed

## Chapter 5

### Is Vertical Integration A Sound Energy Hedging Strategy?

Chevron's most recent quarterly earnings represent a successful application of one of these alternatives – vertical integration. In this chapter, we will review how integration has served as a hedge for Chevron, including reviewing our checklist for when an integrated business is a sound hedging strategy.

#### Production Declines, Prices Decline, Profit Increases?

During the third quarter of 2014, Chevron's upstream unit reported lower production volumes and a lower average price for its production. Nevertheless, the company reported higher year-on-year net income and beat the most equity analyst's forecasts for the quarter (3Q 2014 NI of \$2.95/share vs. \$2.57 for 3Q 2013 and \$2.55 average analyst forecast).

How can this be? Quite simply, Chevron's downstream unit captured wider margins between the cost of buying oil and the price at which it sold refined products. Let's take a brief look at the numbers:

Chevron Corp 3Q 2014 Summary			
	3Q 2014	3Q 2013	% Change
Global Oil Production (kbd)	2,570	2,590	-0.8%
Average Sales Price per (USD/bbl)			
US	87	97	-8.7%
International	93	104	-10.3%
Upstream Earnings (USD millions)	4,649	5,092	-10.6%
Refinery Crude Oil Input (kbd)	1,759	1,716	2.50%
Downstream Earnings (USD millions)	1,387	380	265%

Source: Chevron Corporation, 3Q 2014 earnings release, October 31, 2014

A couple of things stand out in this table. Firstly, as mentioned above, Chevron's downstream unit's 3Q performance more than offset the lackluster performance of the upstream unit, posting earnings that were \$1,007 million higher than reported for the 3Q 2013 vs. a quarter-on-quarter drop in earnings of \$443 million for the upstream. Secondly, crude oil inputs to refineries rose modestly, reflecting Chevron's purchases of third party crude oil. "Despite a decline in crude oil prices, our third quarter earnings were higher than a year ago," said Chairman and CEO John Watson. "Overall downstream results improved, reflecting the benefits of lower feedstock costs and better refinery

reliability, particularly in the U.S.”

### **Is vertical integration really hedging?**

In the previous page where we addressed vertical integration, we offered examples of times when it is worth considering vertical integration investment. To divert capital from your primary business is a difficult decision, especially if the project is quite large. So does Chevron’s vertical integration effectively represent a hedge, even if the firm does not explicitly refer to it as such?

<b>Vertical Integration Checklist for Downstream Investment</b>	
Do the two units’ have inversely correlated revenue or operational cycles?	YES
Does downstream investment facilitate the sale of the upstream unit’s output or can it reduce operational constraint?	YES
Does the downstream unit allow the corporate entity to transfer any risk from the upstream?	YES
Does the downstream unit represent an opportunity to expand/diversify revenue sources?	YES
Does investment in the downstream unit create any risks that pose a greater threat than those the investment is designed to mitigate?	No

These are general questions. When analyzing a possible vertical integration investment in practice, one should develop a more specific and quantitative approach to evaluating these topics, including an internal evaluation of the ability to manage the investment or consider need to bring in a third party with appropriate expertise.

This quick review of vertical integration for Chevron suggests the downstream is an effective hedge in its role as complimentary business to Chevron’s upstream business. The firm’s upstream and downstream business units are under the same corporate umbrella, but operate independently enough to capture distinctly different market opportunities. Importantly, the downstream unit tends to benefit from market environments that may limit the success of the upstream unit and vice-versa. Chevron’s vertical integration extends beyond the firm’s investment in refineries. Chevron is involved in a variety of downstream, midstream, and infrastructure businesses, including but not limited to, pipelines, LNG liquefaction facilities, marketing, processing, and storage. For a company of Chevron’s size, vertical integration is likely just a component of its broader strategy to extract maximum value from its upstream portfolio. Furthermore, hedging exclusively with derivatives may even create risk for a company as large as Chevron.

How can you apply this lesson to your business?



Chevron's 3Q 2014 earnings provide an example of the benefits of vertical integration and why hedging should be as much a function of your global supply chain and operations strategy as the activities carried out by your treasury department. Hedging is less a matter of trading derivatives and more one of risk mitigation, optimizing the operations of your firm and maximizing the value you create.

Even for Chevron with its size and capital, large investment decisions are challenging. They require thorough analysis of the estimated value added, risk mitigated, and cost of entry. Additionally, one should consider whether one's firm has the expertise to manage such an investment. That said, vertical integration can represent a potential hedging strategy, regardless of the price environments in which your firm operates. As oil prices fall, it is possible that vertically integrated companies, especially those with remote or stranded assets, will weather the storm much better than singularly focused companies. Even small E&P companies face constraint and risks which can be mitigated via midstream and downstream investment.

If you're considering making an investment into a different vertical, go through the checklist above to begin your decision making process. Alternatively, contact us and we can discuss your situation and how we can help. Chances are, in a low price environment, you may find investments in other verticals are well worth diverting capital from your core business.

## Chapter 6

# Downstream integration: a peak demand strategy for NOCs

The prospect of peak oil demand undoubtedly introduces risks to the world's crude exporters. Although we predict global demand to continue to grow through 2035, there are already signals that decline could be coming. What does the scenario look like for resource-rich NOCs? And why might vertical integration be the most promising peak-demand strategy. Let's explore the risks and uncertainties surrounding upstream–downstream integration

### NOCs hold the lion's share

Demand for transport fuels (gasoline and diesel) has peaked already in Europe and is expected to peak in the US in the next five years and globally by 2030. Certain sectors are already feeling the early effects of global demand decline. In a scenario of early and radical energy disruption, it's possible that if market elements are just so — slower petrochemicals growth, faster electric vehicle adoption — global demand could peak as early as 2025.

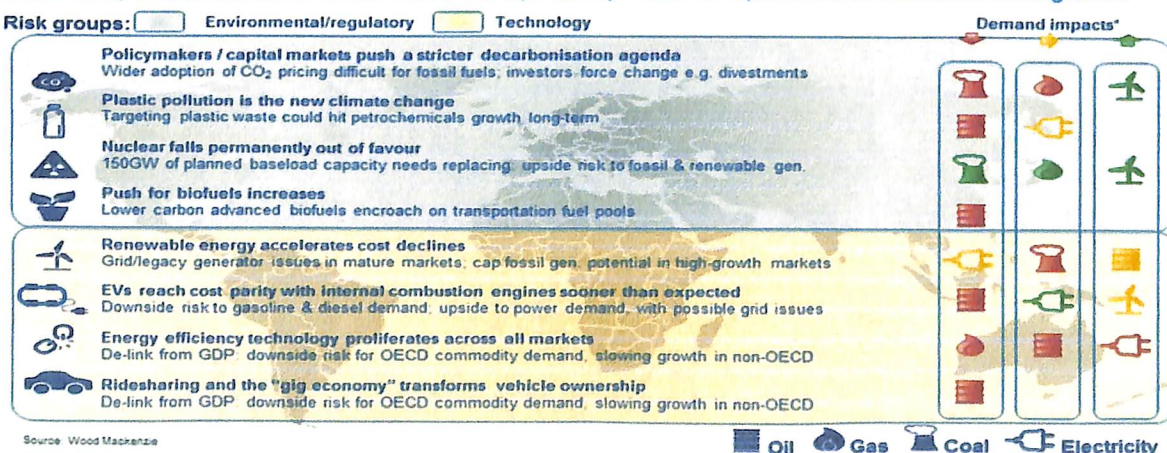
NOCs control approximately 63% of the world's remaining commercial oil reserves, or 945 billion barrels, with a wide range of production costs. Those at the higher end of that cost curve are more vulnerable to a disruption in the market. With few means to adapt for a low-carbon future, the best strategy for these resource-rich NOCs must focus on markets in need of long-term, low-cost oil

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Risks groups and uncertainties are environmental/regulatory and technology

A perfectly efficient market could erode the optionality value of Upstream–Downstream integration

Risk groups:  Environmental/regulatory  Technology



Dome  
stic  
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expan

Source: Wood Mackenzie

## ds to emerging economies

In recent years, many resource-rich NOCs have fed their crude into domestic refineries to meet demand growth and benefit from a low-risk investment. But now their focus is shifting to international refining in emerging economies, particularly in Asia, where demand is growing. These resource-rich, export-oriented NOCs can provide capital for these refineries while securing additional outlets for their crude production.

The challenges of this investment strategy, however, are complex. Companies must carefully consider the host country's ability to absorb large volumes of additional product supply. For instance, both China and India are large growth markets, but are structurally surplus refining capacity – any new investment in refining capacity would only further increase product exports.

### Indonesia: desirable demand growth and fuel balance

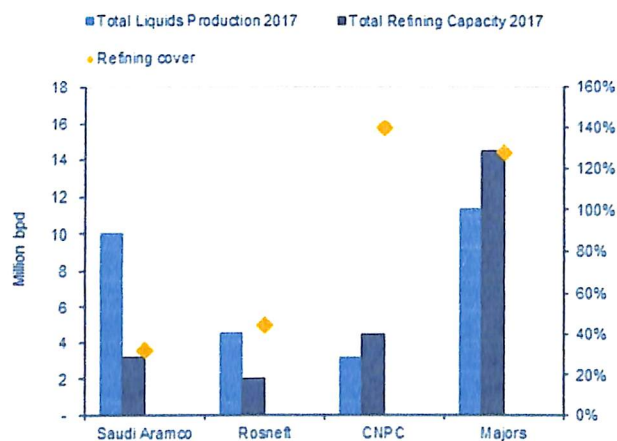
With China and India forecast to remain net exporters in 2025, Indonesia presents attractive near-term investment opportunity given its current production deficit and projected demand growth. Resource-rich NOCs, Rosneft and Saudi Aramco, recently both showed considerable interest in joint venture opportunities in Indonesia.

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## Upstream – Downstream integration can mitigate the Energy Transition

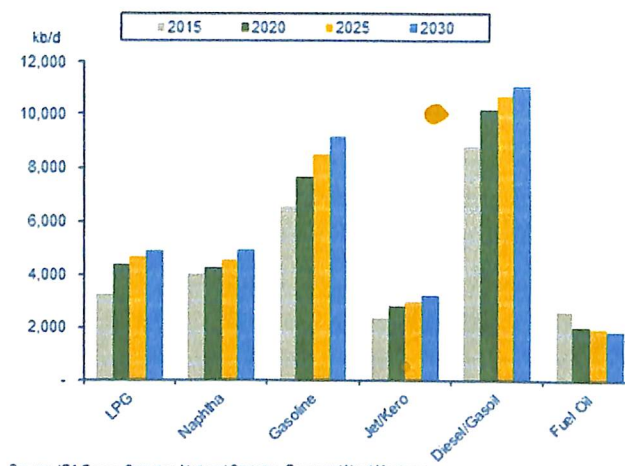
Vehicle electrification results in global peak oil demand, but integrated refinery/chemical sites in Asia can secure long term offtake of Middle East NOC volumes, who are primarily crude exporters

### Key player refining cover



Source: Company reporting, Wood Mackenzie CBT Q1 2018

### Asian demand growth – refining opportunity



Source: IEA Energy Statistics, National Statistics, Forecast Wood Mackenzie

## **Vertical integration for the win**

Beyond commercial returns, international refining also means more employment and capability development opportunities, as well as stronger inter-government relations. And in a future environment of declining global oil demand, ownership of highly competitive refining assets could be critical to sustaining upstream supplies for NOCs.

The 'winners' in this environment will be those resource-rich NOCs with integrated business models that will sustain them in a competitive overall supply chain as global demand falls.

## **Chapter 7**

### **The Strategies Of Brics' National Oil Companies For Energy Security : Joint Ventures Bargaining And Vertical Integration**

The BRIC countries (Brazil, Russia, India and China) have a fast economic growth (GDP growth was above 2.7 % in 2011) and an important influence on the energy market. Brazil might become an important producer and exporter in next decade, thanks to the new pre-salt reserves discovered in 2006. EIA (United States Energy Information Administration) considers that these reserves could increase Brazil's reserves with 50 million barrels, and others think that is even more. Russia's leading role in energy market is clear: its oil production was the second most important after Saudi Arabia in 2011 and its proved oil reserves place it on the eighth place.

China's fast growth has meant that it became a net importer starting 1993. Its R/P ratio is very low (9.9) compared to the one of the world (54.2) (BP Statistical Review of World Energy June 2012). BRIC countries are among the ten first consumers of oil, China was the second most important consumer of oil in 2011 and India was the fourth. In the BRIC countries, the State has decided that the oil sector should remain under his control, by the mean of NOC (National Oil Companies).

Our analysis we'll be based on the fact that BRICs can be split in two different groups: producers (Brazil and Russia) and consumers (China and India). The strategies of their NOCs for energy security enhancement depend on whether the country is a net oil producer or a consumer.

The upstream requires important investments and an advanced technology. Historically, NOCs lack this technology and they have to make partnerships with IOCs (International Oil Companies). IOCs can have access to new reserves, so they are interested by this cooperation. The new discovered reserves in Brazil in the deep offshore offer a certain insurance concerning energy security. But the Brazilian oil sector is competitive and Petrobras, the Brazilian NOC ,is not alone on the market. The extraction of these reserves is difficult and Petrobras will have to make partnerships with IOCs in order to share risks and to benefit from their advanced technologies. Most of Rosneft's assets are on the domestic market and the company has to face with the decline of its most valuable assets, like Western Siberia. The new extraction areas (the Arctic area, East Siberia, the Yamal Peninsula)are more far-off and

the extraction costs are more important than in Western Siberia, whose cost were already more important than those of most producing countries. The joint-ventures between Rosneft and ExxonMobil in August 2011 for the exploration of Kara Sea, Black Sea and West Siberia are a good example.

China and India have growing oil consumptions, 5.5 % of growth in 2011 over 2010 for China and 3.9 % for India (BP Statistical Review of World of Energy, BP, June 2012). China's oil security problem is due to the fact that the reserves that are insufficient for the growing consumption, with a low R/P ratio (9,9 in 2011) compared to the one of the world (54,8). China and India's NOCs want to increase their vertical integration degree, so they develop in downstream markets in order to enhance supply security. Arrow (1975) noted that downstream integration permits to companies to mitigate risks, because profits can vary between upstream and downstream.

NOCs can also have access to new markets, which would be closed for them otherwise.

This study concentrates on the particularities of joint venture negotiation between a NOC and a IOC in oil industry. Joint ventures in oil industry are different from business joint ventures, because there is no joint profit; partners' joint target is profit research or making an operation together. Government and IOCs have different objectives: the government wants to obtain the maximum welfare from its natural resources, and the private company's target is to maximize its participation and the welfare by the oil resources that it will find at the lowest cost and the most important margin possible. Joint-venture negotiation has been analyzed in the literature by Rao and Shakun (1974), Harrigan (1984), Inkpen and Beamish (1997), Yan (2011) etc. We'll present Brazil and Russia's examples in joint ventures and we'll also concentrate on some factors who can affect bargaining power of the two players and also a short literature review of joint venture bargaining in oil industry.

For China and India, we'll going to concentrate on the impact of vertical integration strategy of their NOCs on countries' supply security. There is a certain number of studies that were made concerning vertical integration, but NOC literature is limited. This is the reason why World Bank started in 2008 a study concerning NOCs and value creation. So, NOCs role in supply security has been few studied, some documents like the CRS Report for Congress mention it..

### **Methods**

In this study, we'll use econometric technique in order to show the influence of vertical integration degree on supply security for China and India. We'll employ Arkel, Boots and Jansen's report in order to create several indicators for long termed supply security measurement: the diversity index, the diversity of supply regions, the diversity of supply regions and socio-politic stability and the resources depletion. We'll create an index for oil supply security, as the average of these four indicators. Vertical integration will be measured by the different dimensions identified by Harrigan (1986): the degree, the number of stages of processing, the breadth of

activities and the ownership form. We use a regression model to show the relationship between oil supply security and vertical integration.

### **Results**

The econometric model couldn't be run, because data for some periods are difficult to be found for China and India. The model is only in a conceptual form for now.

### **Conclusions**

As per Van der Linde (2000) emphasizes, the desire to ensure supply and demand security has sustained the vertical integration and the internalization of oil companies since the beginning of the modern oil industry. Even if upstream is the main focus of NOCs from China's and India's investments abroad, building refineries and pipelines can contribute to the reinforcement of their relationships with the host countries. The notion of reserves is an economic one, oil reserves will increase with the prices growth. But more technical and human capital will be needed, because the oilfields that will be explored need advanced technology and experience. IOCs have access to the up-to-date technology, which is less easily available for NOCs. So partnerships between oil producing countries NOCs, like Russia and Brazil, should develop in the future.

The acronym «BRIC» has been introduced for the first time by the economist Jim O'Neill from Goldman Sachs in 2001, in a study published in the Global Economics Papers, with the title «Building Better Global Economic BRICs».2

The R/P ratio (Reserves / Production) is obtained by the division of energy reserves remaining at the end of the year by the production of that year.

The result is the period of time for which these reserves will be sufficient if the production level remains the same.

## **Chapter 8**

### **The Role of National Oil Companies in the International Oil Market**

In the United States, the term "big oil companies" is likely to be taken to mean the major private international oil companies, largely based in Europe or America. However, while some of those companies are indeed among the largest in the world, by many important measures, a majority of the largest oil companies are state-owned, national oil companies. By conventional definitions, national oil companies hold the majority of petroleum reserves and produce the majority of the world's supply of crude oil. Since national oil companies generally hold exclusive rights to exploration and development of petroleum resources within the home country, they also can decide on the degree to which they require participation by private companies in those activities. The national oil companies typically do not operate strictly on the basis of market principles. Because of their close ties to the national government, in many cases their objectives might include wealth re-distribution, jobs creation, general economic development, economic and energy security, and vertical integration.

Although these objectives might be desirable from the point of view of the nation's government, they are unlikely to be equivalent to the maximization of shareholder value, the stated objective of the private international oil companies. Differing objectives might be considered to be important only if they lead to different characteristics and outcomes, which is the case for the national oil companies. Many of these companies have been found to be inefficient, with relatively low investment rates. They tend to exploit oil reserves for short-term gain, possibly damaging oil fields, reducing the longer term production potential. Some also have limited access to international capital markets because of poor business practices and a lack of transparency in their business deals. High oil prices since late 2003 have masked the effect of some of these characteristics in the flow of oil revenues. However, if the price of oil moderates, the potential supply constraint related to the inefficient operations of the national oil companies may be a destabilizing factor in the world oil market.

A wide variety of policy directions can be taken to mitigate the potential challenge posed by the dominance of national oil companies. Demand management policy can reduce the U.S. dependence on imports. The U.S. government can use its political influence to try to encourage nations not to use national oil companies to forward the aims of the government, but to follow commercial practices to maximize revenue flows. An expanded supply of oil could be encouraged as a condition for trade and aid agreements in some cases. Finally, promoting international trade and recognized commercial practices could be encouraged.

In June 2007, ExxonMobil Corporation and ConocoPhillips, two of the largest U.S. oil companies,



abandoned their multi-billion dollar investments in the heavy oil deposits of the Orinoco basin in Venezuela. This action followed the breakdown of negotiations between the companies and the government of President Hugo Chavez and Petroleos de Venezuela (PDV), the Venezuelan national oil company. Four other international oil companies, including Total SA from France, Statoil from Norway, BP from Great Britain, and Chevron from the United States, accepted agreements that raised the PDV share in their Orinoco projects from approximately 40% to a controlling interest of about 78%.<sup>1</sup> ConocoPhillips, especially, was adversely affected by the decision.

ConocoPhillips recorded 1.1 billion barrels of proved reserves from its Venezuelan ventures. This amounted to approximately 10% of the company's total reserve holdings, and its production from Venezuela amounted to 4% of its total crude oil production. Although ConocoPhillips continues to negotiate compensation for its holdings, the company took a \$4.5 billion dollar write-off against second-quarter 2007 earnings. The company was seen as less likely to be able to meet its reserve replacement targets and the price of its shares fell on the stock market.<sup>2</sup> On the Venezuelan side, PDV expanded its reserve and production position, and its strength in the international oil market.<sup>3</sup> Venezuela, traditionally, has a large share of crude oil imports into the United States. This oil flow is now more directly under the control of the Venezuelan government which may or may not allow the flow of crude oil to follow economic market forces.

This report assesses the position of national oil companies, and how their evolving strength may affect the availability of supply in the oil market, and hence, oil security. The report also examines the effects of national oil company expansion on the major private international oil companies as well as how these companies might differ in motivation and results. Policy options to deal with the rise of national oil companies by the countries without them are also evaluated.

### **The Market Position of National Oil Companies**

Rankings of companies can be accomplished using a number of different criteria. In the oil industry, based as it is on current production to generate current earnings and on reserve positions to ensure the future viability of the enterprise, several standards need to be applied to assess the evolving nature of the companies in the industry. Additionally, investment, in the form of exploration and development expenditures, serves as a link between the present and the future, ensuring an ongoing continuity for the company so that reserves are not unduly depleted by current activities. Consumers also have an interest in the structure and size of firms and their activities if the current production level, as well as the proved reserve position of the companies or industry, is declining. If current production declines in the face of growing world demand, it is likely that prices will rise, and the possibility of physical shortages will be heightened. If exploration and development expenditures are reduced because of problems encountered by some firms in accessing international capital markets, the relative scarcity of oil might increase, leading to higher future prices, as well as potentially restricted supply

**Table 1. Comparative Ranking of the Top Ten Oil Companies**

<b>Rank 2006</b>	<b>Company</b>	<b>Ownership</b>	<b>Rank 2000</b>	<b>Company</b>	<b>Ownership</b>
1	Saudi Aramco	State	1	Saudi Aramco	State
2	ExxonMobil	Private	2	PDV	State
3	NIOC	State	3	ExxonMobil	Private
4	PDV	State	4	NIOC	State
5	BP	Private	5	Shell	Private
6	Shell	Private	6	BP	Private
7	PetroChina	90% State	7	Pemex	State
8	Chevron	Private	8	Pertamina	State
9	Total	Private	9	Total	Private
10	Pemex	State	10	KPC	State

**Table 1** shows a ranking of the top ten world oil companies on the basis of a composite criterion. In 2006, five of the top ten companies could be classified as state owned and operated. In 2000, six of the top ten companies were state owned and operated. On the surface, these rankings appear to show a decline in the importance of state-owned firms in the world oil market. However, these rankings may give an unclear picture of the underlying relative strengths of the private and state-owned companies in the world oil market

Table 2 shows the leading firms in terms of world-wide petroleum liquids reserves.

**Table 2. World Liquid Petroleum Reserves Holdings**  
(millions of barrels)

Rank 2006	Company	Reserves	Rank 2000	Company	Reserves
1	Saudi Aramco	264,200	1	Saudi Aramco	259,200
2	NIOC	137,500	2	INOC	112,500
3	INOC	115,000	3	KPC	96,500
4	KPC	101,500	4	NIOC	87,993
5	PDV	79,700	5	PDV	76,852
6	Adnoc	56,920	6	Adnoc	50,710
7	Libya NOC	33,235	7	Pemex	28,400
8	NNPC	21,540	8	Libya NOC	23,600
9	Lukoil	16,114	9	NNPC	13,500
10	QP	15,200	10	Lukoil	11,432

Every firm in the top ten reserve holders, with the exception of Lukoil, in both 2006 and 2000 was state owned. Among the major international oil companies, ExxonMobil is ranked fourteenth, BP seventeenth, Chevron nineteenth, ConocoPhillips, twenty-third, and Shell is ranked twenty-fifth in 2006. These five firms hold only 3.8% of world liquid reserves, and their major holdings are in the

United States and Canada. In contrast, the top ten firms listed in Table 2 hold 80.6% of the total world liquid reserves. The top ten companies in 2006 in Table 2 have an average reserve to production ratio of 78 years, with INOC, the Iraqi National Oil Company, the highest at 173 years and Lukoil, a privately held Russian company, the lowest at 24 years.<sup>6</sup> The five large international oil companies have reserve to production ratios of 11 years.

These values suggest that the ten largest reserve holding companies, largely state owned, will be major forces in the world oil market about seven times as long as the five major international oil companies. In a market where reserve position is likely

to translate into production and pricing power, the state oil companies are in dominant position, and the international oil companies are likely to play a lesser role. It is also not likely that the reserve positions of the companies will change in favor of the international oil companies in the future. As nations establish their own national oil companies, territories open for exploration and development by private companies may diminish. As suggested by the example of Venezuela, cited in the opening section of this report, even in countries where there are partnerships between the private oil companies and national oil companies, if there is any revision of ownership shares, it is likely to be in favor of the national oil companies. Two factors affect this observation. Oil-producing nations seem to be displaying an ever more nationalistic attitude toward their natural resource endowments, and the national oil companies are viewed as custodians of that resource.

If there is opposition to U.S. foreign policy objectives, or if there is a more general negative reaction to the spread of global markets and private industry, nationalization of oil resources and transference to the national oil company is likely one of the most direct ways to make a political statement. Given the tight balance between global supply and demand, this statement can be made with little or no costing lost revenues

**Table 3** shows the ten leading producing companies in the world. A company's ability to produce crude oil depends on access to oil deposits, but it also depends on access to modern technology. The private international oil companies generally have access to state-of-the-art technologies, which are less easily available to some other firms. Gaining access to the best technology for exploration, development, and production is one of the key motivations oil producing nations have for entering production-sharing agreements with the private international oil companies.

**Table 3. World Petroleum Liquids Production**  
(thousands of barrels per day)

<b>Rank 2006</b>	<b>Company</b>	<b>Production</b>	<b>Rank 2000</b>	<b>Company</b>	<b>Production</b>
1	Saudi Aramco	11,035	1	Saudi Aramco	8,044
2	NIOC	4,049	2	NIOC	3,620
3	Pemex	3,710	3	Pemex	3,343
4	PDV	2,650	4	PDV	2,950
5	KPC	2,643	5	INOC	2,528
6	BP	2,562	6	ExxonMobil	2,444
7	ExxonMobil	2,523	7	Shell	2,268
8	PetroChina	2,270	8	PetroChina	2,124
9	Shell	2,093	9	BP	2,061
10	Sonotrach	1,934	10	KPC	2,025

In 2006, seven of the top ten producing companies were state owned, including the five largest producers. Although the three largest international oil companies were among the top ten producers, and two of them, BP and ExxonMobil, even managed to increase their total output, their production was from relatively small reserve bases, shortening the time they can remain in the market as producers without major new discoveries. The effects of rising world demand and higher prices since 2003 can be seen in the increased output of most of the companies on the list. One final factor in the power of the national oil companies should be noted. The Organization of Petroleum Exporting Countries (OPEC) allows these companies to compete to a degree they deem compatible with their national goals as specified by their governments and still coordinate their actions through OPEC when it is in their interests to show a more unified front in the world market. This ability to compete

or coordinate their activities and decisions when it is in their, and their nations', interests is not available to the private international oil companies

**Vertical Integration.** Although national oil companies in oil-producing nations have their roots in upstream operations, some are striving to achieve vertical integration.<sup>12</sup> On an economic level, vertical integration allows the national oil company to capture the value added from producing and selling petroleum products. PDVSA's acquisition of Citgo in the United States provided refining as well as retail marketing outlets for Venezuelan oil. In addition, demand security was enhanced through gaining a position in the large U.S. gasoline market. In other cases, national oil companies might be able to gain access to markets otherwise not available to them. The national oil companies may also be able to achieve a greater degree of diversification and mitigation of risk through vertical integration. Oil prices have tended to be volatile. Profits may accrue to different parts of the supply chain at different times and during various market conditions. Vertical integration may enhance the ability of national oil companies to be profitable in changing markets.

#### **Characteristics of National Oil Companies**

Because national oil companies may be motivated by different objectives than private oil companies, their performance characteristics are also likely to be different. This might be of little consequence to consuming countries except that, in a tight oil market, the national oil companies may become an impediment to the smooth functioning of the world oil market in the future.

**Efficiency.** Productive efficiency is normally defined as maximizing the output associated with any given level of inputs. Measuring productivity in the oil industry, compared to a typical manufacturing industry, is difficult because geological factors enter into the process on the input side and may not be controllable by management in the normal sense. However, comparative econometric productivity studies within the oil industry do exist.<sup>13</sup> Eller, Hartley, and Medlock (EHM) developed a series of empirical models to estimate the behavior of international private, as well as national, oil companies with respect to their relative efficiency. Model 1 is the basic model that views revenue as the output of the firm and uses gas reserves, oil reserves, and number of employees as the productive inputs. An estimated efficiency value of 1.0 is the highest score and 0.0 is the lowest score.

#### **Investment.**

Because of the demands of the government and national treasuries, national oil companies may have a shorter time horizon for operational decisions than the international oil companies. The national oil companies may have an undue focus on earning current revenues and maximizing current production. This could result in mis-management of existing fields, which allows a smaller recovery percentage than theoretically possible, and a neglect of exploration and development. In the longer term, damage to the world oil market could be enhanced by the dominant position the national oil companies have in terms of potential

For consumers, the national oil companies' focus on current production may

work to keep the world price of oil relatively lower in the near term. However, if the national oil companies ignore investment in exploration and development, it could mean higher oil prices in the future. Some estimates of the needs for oil industry investment total \$16 trillion over 30 years.<sup>15</sup> If the national oil companies do not undertake investment on this scale, and if they and their governments exclude the international oil companies from developing reserves in their countries, the world oil market could be supply-constrained in the future, and prices might be higher than if higher investment took place.

**Table 6** shows the top 10 companies with respect to upstream, or exploration, development, and production, capital expenditures (Capex). Eight of the top ten companies are private, or in the case of Petrobras from Brazil, 68% privately held.

Only Petro China and Statoil, among the publicly held national oil companies, are among the world leaders in upstream Capex. The eight private oil companies account for 75% of the total of \$94.5 billion invested upstream by the top ten companies. The two entirely publicly held companies in the top ten accounted for about 18% of the total.

The Capex values do not reflect the limited access international oil companies have to potential oil deposits, or the preferred access to potential reserves that national oil companies are likely to enjoy. However, even with the leading companies being privately held, some critics of the industry contend that these companies are not investing enough, especially in light of their record profit levels since 2004.

The private international oil companies' ability to make the investments needed to meet projected demand for oil is limited by a number of factors. The international oil companies may not have access to what they consider to be favorable prospects.

Beyond the restricted access to potential reserve areas around the world, it may be that large companies have expertise in developing and operating large fields, a type of oil deposit in diminishing availability. In this sense, there may be a mismatch between the capabilities of the companies and the reserves to which they have access.

The price of oil is volatile over time. As a result, a conservative investment policy, based on an expected price, not necessarily fully reflecting high current prices, might be in the companies' interest. The international oil companies may be making investment decisions on the basis of a future market price of oil lower than the current price, leading to lower levels of investment. Tight markets in trained

**Table 6. Top Companies  
Upstream Capital Expenditures,**

<b>Rank</b>	<b>Company</b>	<b>Capex</b>
1	ExxonMobil	14,470
2	Shell	12,046
3	BP	10,237
4	PetroChina	10,160
5	Total SA	10,040
6	ConocoPhillips	8,844
7	Chevron	8,389
8	Petrobras	7,194
9	EnCana	6,650
10	Statoil	6,423



## **Chapter 9**

# **Analysis Of Mergers And Acquisitions In Oil And Gas Sector In India And Its Impact On Operating And Financial Performance**

Mergers and Acquisitions (M&A) are the most popular means of corporate restructuring. They have played a significant role in growth of number of leading companies in the world. Due to the deregulation of the Indian economy and recent economic reforms many International and domestic players have entered the Indian industries. This has lead to lot of corporate restructuring due to increasing competitive pressure. This paper focuses on studying the impact of Oil and Gas sector due to M&A by pre and post financial and operating indicators such as operating profit margin, PBIT margin, Net profit margin, ROA, RONW, ROCE, Investment Turnover ratio, Debtor turnover ratio etc. The paper studies the mentioned ratios of five major mergers and acquisitions activities happening in India from 2005 to 2015. The main objective of this paper is to find effect of merger and acquisitions (M&A) on the financial performance and operating performance of the acquiring firms in the post merger period. The study shows that there is no significant improvement in financial and operating performance of the companies due to mergers and acquisitions.

### **INTRODUCTION**

Mergers and Acquisitions (M&A) have played a very important role in the transformation in the Indian industrial sector. M&A activities increased after the Second World War period. The functional importance of M&As has undergone a sea change since liberalization in India. The MRTP act has been amended along with other legislations so as to assist large businesses and foreign companies to follow the M&A route for growth. In the post 2000 period we have witnessed a rise of M&A in India. The number and size of deals have become very big and it reached 1.3% of the global deal value in 2006.

So the reasons for all this are:

- Growth
- Need for reorganization within an industry to eliminate over-capacity
- Financial opportunities

### **CASES STUDIED:**

In 2011, the acquisition of Abbot Point Coal Terminal, Australia was done by Adani Enterprises. This was the third overseas acquisition by the Adani Group. The deal size was also one of the largest amongst all port acquisitions in the world, and made the Adani Group the largest Indian investor in Australia.

GVK is one of largest power and infrastructure group of India, worth A\$8bn bought two Australian coal mines from Hancock Prospecting which was privately controlled by the billionaire Gina Rinehart.

GVK Power, part of the GVK Group, acquired Australia's Hancock Coal for \$1.26 billion. GVK acquired majority holding in railways, coal resources, and port infrastructure projects of Hancock Coal. The company did long term contracts to supply 20 million tonnes of coal every year to support around 7,500 megawatts of power generating capacity.

Oil and Natural Gas Corp of India(ONGC) bought UK-listed Imperial Energy for £1.4bn (\$2.6bn) which was its first acquisition of a foreign exploration and production company. The company aimed at securing foreign oil reserves and paid around £90m. Imperial had more than 6.8 billion barrels of oil equivalents in reserves. It was the biggest overseas acquisition by ONGC.

Coastal Gujarat Power Limited company was acquired by Tata enterprises in 2007. Coastal Gujarat Power Limited is a subsidiary of Tata Power Company Limited now. Coastal Gujarat Power Limited generates and sells electric power in Gujarat, India. Coastal Gujarat Power Ltd. Operates an ultra mega power project in Mundra which generates around 4000 mega watts of power. The company is based in Mumbai, India and was incorporated in 2006.

Suzlon acquired the German wind turbine manufacturer Repower in 2007. This improved the company's foothold in Europe. With the acquisition of REpower's highly respected multi-megawatt class wind technology,

### **OIL AND GAS SECTOR IN INDIA**

The oil and gas sector is an important industry in India and plays a vital role in decision making for all the other important sections of the economy. India was the third largest consumer of oil in the world in 2015. Oil imports constitute about 81% of India's total domestic oil consumption in 2015-16. This sector is one of 25 key areas under "Make in India" initiative. Natural gas was around 6.5% of the energy mix, in 2015. India has 230.066 MMTPA of refining capacity with a surplus refining capacity of 15%, making it the second largest refiner in Asia. India is the fourth largest LNG importer in 2015 with 6.4% of global imports. India held nearly 635 MMT of oil reserves in 2015 in western part of the country. About 49% of reserves are onshore resources, while 51% are offshore.

A recent report indicated that the Indian oil and gas industry is anticipated to be worth US\$ 139.8 billion by 2015. India's economic growth is closely related to energy demand. It is projected that the need of oil and gas will grow in the future, therefore, investments in the sector are quite sensible.

The demand for oil and gas is increasing everyday and the Government has adopted several policies for the same. 100% FDI has been allowed in many sectors including natural gas, petroleum products and refineries. India ranks fifth in LNG importers in the world. The country accounts for 5.5% of the world trade of LNG. In May 2016, the country imported 2.08 Billion Cubic Metres (BCM) of LNG witnessing a 43.38% YoY increase. The demand is expected to grow at a 16.89 % CAGR to 306.54 Million Metric Standard Cubic Metres per Day (MMSCMD) by 2021.

## **FUTURE GROWTH IN OIL AND GAS SECTOR:**

- Oil and gas sector plays significant role as it is one of the third energy required is met by the hydrocarbons.
- EIA projects India and China will show for about half of global energy demand growth through 2040, with energy demand of India is growing at 3.2% per year. As per BP Energy Outlook 2016, energy consumption of India is projected to grow at 4.2% per annum upto 2035.
- In 2016, country's natural gas pipeline network is spreaded over 14760.6 km. Another which is under various stages of implementation, 15000 km is received to complete national gas grid.
- New Domestic Gas Pricing guidelines is checking marketing freedom for difficult areas, and resolving other concerns in the existing areas under exploration and production have resulted into unlocking of reserves valued at Rs. 3.5 Lakh crore.
- There are other plans to connect 326 cities with city gas distribution network by 2022. The main concern is to promote use of natural gas, priority for allocation of domestic gas was accorded to PNG/CNG segments for meeting 100% demand and faster roll out of PNG connections and CNG stations.
- India's Refining capacity is forecasted to reach 256.55 MMTPA by 2020 after completion of the projects undertaken by refineries which are under process.
- The price of diesel has been made effective October 19, 2014, to provide better service delivery due to increased competition in the auto fuel sector. The saving in subsidy is been provided for funding anti-poverty and social sector schemes.
- The Government is focused on providing affordable, and modern energy to every person ,to promote clean cooking fuel. The planning is also going by government to increase LPG coverage by providing 10 crore new LPG connections in next 3 years till 2019.
- Under the scheme called Pradhan Mantri Ujjwala Scheme (PMUY), free connections of LPG are planned to be provided in next 3 years till 2019. It is being done to empower women of BPL families of 500 crore.
- LPG consumers are influence to voluntarily give up their LPG subsidy under 'GiveltUp' campaign. In june 2016, Against each `GiveltUp' consumer, more than 1.03 crore LPG consumers have given-up LPG subsidy .

- PAHAL launched for direct transfer of LPG subsidy to the bank accounts of LPG consumers which has resulted in right targeting of subsidy by elimination of 3.34 crore duplicate/inactive connections and saving of more than Rs. 21,000 crore of subsidy.
- A scheme called Direct benefit transfer of Kerosene (DBTK) is planned to launch for targeting of kerosene subsidy, would be launched initially in 40 selected cities across 9 States during 2016-17.
- The government has planned to roll out BS-IV auto-fuels from the country by April 1, 2017 and jump into BS-VI auto-fuels all over the country by April 1, 2020. It would help major investment in refinery up gradation, services sector ,auto industry, and related manufacturing .

#### **LITERATURE REVIEW**

A merger is the combination of two firms, where only one firm survives and assumes all the assets and obligations of the merged firm, which ceases to exist legally (Gaughan, 1999). Thus, mergers involve a consolidation process and the creation of a new firm with the dissolution of the original firms (Ross, Westerfield & Jaffe, 1998; Gaughan, 1999). Whereas, an acquisition relates to the transfer of ownership between two firms, where one firm (the acquirer) buys a part or the totality of another firm (the acquired) and establishes itself as the new owner recent history numerous literature and papers have been researched on the impact of M&A on corporate capital consolidation and several theories have been proposed to understand the empirical validation of such impacts. Some of the effects that have been widely studied are the returns to shareholders following the merger and acquisition and the post-merger performance of the merged business entity. Following this, several measures have been postulated to understand and measure the performance of the company following M&A. These include the long and short term impacts of announcement, the effect of hostile takeovers etc. Mixed results were shown by Ikeda and Doi after they investigated the performance of the mergers of Japanese manufacturing firms using the measure of ROE and found that half the sample had their ROE increased post M&A and ROA increased in half the cases. However, over the 5 year period both these profitability measures showed an increase in more than half the firms, showing that there was a adjustment period where the acquiring firms learn to manage the new organisation. Kruse park and Suzuki examined the long term operating performance of Japanese companies where the sample used was 56 manufacturing organisations during the period 1966-97. This study showed a improvement of the operating performance over a 5 year period and that pre-merger and post-merger performance are highly correlated.

Research literature has shown us that the operating performance of the acquiring firms have shown mixed results in terms of the difference between the post-merger and pre-merger performance. Thus it would be extremely difficult to conclude whether the M&A can be use as a catalyst by acquiring firms to achieve better operating performance. Ramaswamy and Waegelein, 2003 tested the long-term post-merger financial performance of merged companies in Hong Kong to determine relationships between post-merger performance and firm size, the compensation plan, method of payment, and industry type. The analysis covered the five years pre and post-mergers (using operating cash flow returns on market value of assets as the measure of performance). The results have concluded that there is a positive significant improvement in the postmerger performance. Healy, Palepu, Ruback examined the performance of 50 US mergers post acquisition using. The

criteria of cash flow performance and found that the operating performance of these companies were distinctly better following acquisitions. But the other claim that the operating cash flow performance did not improve following acquisitions was claimed by Ghosh in his paper. Kruse park and Suzuki examined the long term operating performance of Japanese companies where the sample used was 56 manufacturing organisations during the period 1966-97. This study showed a improvement of the operating performance over a 5 year period and that pre-merger and post-merger performance are highly correlated. Research literature has shown us that the operating performance of the acquiring firms have shown mixed results in terms of the difference between the post-merger and pre-merger performance. Thus it would be extremely difficult to conclude whether the M&A can be used as a catalyst by acquiring firms to achieve better operating performance.

Kaur,2002, compared the pre-merger and post-merger performance of acquiring companies using a set of financial ratio. The study concluded that profitability and efficiency declined post acquisition but there was no statistically different performance. However,Pawaskar who undertook the same study using firms during 1992-95 and ratios of profitability, growth, leverage and liquidity concluded that acquiring firms performed better then industry average in terms of profitability. When he performed a regression analysis, he found that to the contrary of earlier finding, there was no increase in post-merger profits compared to the industry average.

PramodMantravadi and A Vidyadhar Reddy analysed the post-merger performance of acquiring firm's different industries in India. The study found that there are minor variations in terms of impact on operating performance following mergers, in different industries in India. Empirical testing of post-merger performance of Indian companies has so far been proved inconclusive in order to derive any meaningful inference. The studies were also highly skewed in favour of a particular sector especially manufacturing ones and have a time period bias as only short time intervals were chosen to measure the performance. Ramakrishnan (2008), investigated that whether mergers in India have resulted in improved long-term post-merger firm operating performance through enhanced efficiency or not with the help of hypotheses. This study indicated that in the long run, mergers emerge to have been financially beneficial for firms in the Indian industry. Kumar,2009, examined the post-merger operating performance.The study attempts to identify synergies, if any, resulting from mergers. The study uses accounting data to examine merger related gains to the acquiring firms. It was found that the post-merger profitability, assets turnover and solvency of the acquiring companies, on an average, depicted no improvement when compared with pre-merger values. N. M. Leepsa& Chandra Sekhar Mishra (2012),in their research paper on "Post Merger Financial Performance: AStudy with Reference to Select ManufacturingCompanies in India",tries to study the trend in merger and acquisition (M&A) particularly with reference to manufacturing companies. The present study is an attempt to find out the difference in post-merger performance compared with pre-merger in terms of profitability, liquidity and solvency. The statistical tools used are descriptive statistics and paired sample t-test.

## **RESEARCH METHODOLOGY: -**

### **Objectives of the study**

- To study the effect of merger and acquisitions (M&A) on the financial performance of the acquiring firms in the post merger period.
- To study the effect of merger and acquisitions (M&A) on the operating performance of the acquiring firms in the post merger period.
- **Research hypothesis**
- Following hypotheses were formulated based upon the objectives:
- **H01:** There is no improvement in the financial performance of acquiring firms in post merger of Oil and Gas sector.
- **H02:** There is no improvement in the operating performance of acquiring firms in post merger of Oil and Gas sector.

### **Sample selection**

The present study takes into account the Mergers in Oil and Gas sector announced between 2005 and 2015. We have compared pre-merger 1 year with post-merger years i.e. three years after merger has taken place. We have only taken companies into consideration where we can do comparison after 3 years of merger till 2015. Therefore, the sample was limited to merger announced before 2012. The sample size of study comes out to be 5 mergers in the recent study period.

### **Statistical tools & techniques**

Data has been analyzed using various sources. Also various statistical tools and techniques have been applied in this study. Mean, Variance and standard deviation were used for descriptive statistics. The hypotheses are tested using Paired Sample t-test. SPSS and MS-Excel have been used to analyze data.

### **Data collection**

Secondary sources have been used for data collection of various financial ratios for 1-year prior up to 3 years of post-merger of the sample companies which are: Moneycontrol.com and annual reports of the companies.

### **DATA ANALYSIS/HYPOTHESIS TESTING**

To analyze and test the hypothesis of one year pre merger (-1 year) and 3 year post merger (+1 year), (+2 year) and (+3 year) we have used "paired sample t-test" with confidence interval of 0.05 or 95% and descriptive analysis for mean difference. The results are shown in following table:

	Mean Value				T-Value			P-Value(2 Tailed)		
	-1	+1	+2	+3	-1,+1	-1,+2	-1,+3	-1,+1	-1,+2	-1,+3
<b>1. Profitability standards</b>										
Operating profit margin	0.72	0.742	0.54	1.164	-0.503	1.743	-0.488	0.641	0.156	0.651
PBIT margin	31.98	18.5	8.34	9.568	0.934	1.176	1.218	0.403	0.305	0.29
Cash profit margin	0.602	0.662	0.718	0.882	-0.87	-0.789	-1.13	0.434	0.474	0.322
Net profit margin	23.23	6.06	-8.55	-15.66	1.109	1.318	1.465	0.329	0.258	0.217
Return on Capital employed	11.25	8.86	9	4.9	0.783	0.7	0.982	0.477	0.523	0.382
Return on Net worth	13.69	12.242	9.984	10.98	0.374	0.47	0.327	0.734	0.671	0.765
Return on asset	8.27	5.95	3.97	2.93	1.359	1.003	0.962	0.246	0.373	0.391
<b>2. Operating standards</b>										
Inventory turnover ratio	18.48	9.56	12.31	10.57	1.022	0.895	0.983	0.382	0.437	0.398
Debtor turnover ratio	6.7	9.67	8.38	4.73	-0.126	0.047	4.539	0.906	0.965	0.011
Investment turnover ratio	1.04	0.45	1.98	4.06	1.578	-0.554	-0.986	0.19	0.609	0.38
Asset turnover ratio	47.08	34.85	38.37	31.12	1.484	1.544	1.778	0.212	0.197	0.15

### Financial/Profitability ratios:

1) Merger has brought no change in operating profit post period (+1 year)  $p=0.641 > 0.05$ . In comparison to pre-merger (-1 year) and post-merger (+ 2 year)  $p = 0.156 > 0.05$  still we can see there is no change in operating profit of the company. In comparison to pre-merger (-1 year) and post-merger (+ 3 year)  $p=0.651 > 0.05$  again in 3rd year there is no change in operating profit of the company.

2) There is no improvement in PBIT margin of the company (+1 year)  $p=0.403 > 0.05$ . In (+2 year)  $p=0.305 > 0.05$  again no change and improvement in PBIT margin. In (+3 year)  $p=0.290 > 0.05$  again no change. So M&A doesn't improve PBIT margin of the company.

3) Cash profit margin of the company also has no change (+1 year)  $p=0.434 > 0.05$ . In (+2 year)  $p=0.474 > 0.05$  still no change in second consecutive year. In (+3 year)  $p=0.322 > 0.05$ , here also we can find in third consecutive year also there is no change in cash profit of the company.

4) M&A has not brought any change in Net profit of the company (+1 year)  $p=0.329 > 0.05$ . in (+2

year)  $p=0.258>0.05$  still no improvement in second post year of M&A. In (+3 year)  $p=0.217>0.05$  again M&A leads no change in net profit margin of the company.

5) Return on capital employed has also not improved by M&A as in (+1 year)  $p=0.471>0.05$ . In second consecutive year (+2 year)  $p=0.523>0.05$  no improvement again. In third consecutive year (+3 year)  $p=0.382>0.05$  still M&A is not able to get return on capital employed.

6) Return on net worth of the company hasn't received any significant improvement from M&A as in (+1 year)  $p=0.734>0.05$ . In (+2 year)  $p=0.672>0.05$ , no improvement can be seen. In (+3 year)  $p=0.671>0.05$  again no significant improvement can be seen.

7) M&A also doesn't bring any improvement in Return on asset of the company as in (+1 year)  $p=0.246>0.05$ . In (+2 year) ROA leads to no improvement of the company  $p=0.373>0.05$ . In (+3 year)  $p=0.391>0.05$  has no change in ROA of the company.

#### **Operating ratios:**

1) Inventory turnover ratio is also not affected in improvement by M&A as in (+1 Year)  $p=0.382>0.05$ . In (+2 year)  $p=0.437>0.05$  still no change in company ITR. In (+3 year)  $p=0.398>0.05$  again no improvement in ITR of the company.

2) M&A leads again no change in Debtor turnover ratio in (+1 year)  $p=0.906>0.05$ . In second consecutive year (+2 year)  $p=0.965>0.05$  still it is showing no improvement. In third consecutive year(+3year)  $p=0.011<0.05$  here we can see some changes and improvement in DTR.

3) Investment turnover ratio also doesn't has no significant changes by the effect of M&A as in (+1 year)  $p=0.190>0.05$ . In post second year (+2 year)  $p=0.609>0.05$  still no improvement in the ratio. In post third year (+3 year)  $p=0.380>0.05$ , as we can see again M&A leads to no significant effect in investment turnover ratio of the company.

4) Asset turnover ratio of company has not improved significantly as in (+1 year)  $p=0.212>0.05$ . In post second year (+2year)  $p=0.1997>0.05$ , still no improvement in ATR of the company. In post third year (+ 3year)  $p=0.150>0.05$ , again no improvement caused by M&A in the company.

Hence, overall it can be said that Mergers and Acquisitions (M&A) in Oil and Gas sector leads to change in improvement of the company. Therefore, our null hypothesis( $H_0$ ) was reliable and accepted and alternative hypothesis has been rejected( $H_1$ ).

#### **CONCLUSION**

Mergers and Acquisitions (M&A) prime motive is to improve the value, wealth and growth of the



enterprise but in the current case it is been observed that M&A has no effect on the company performance in Oil and Gas sector. It has been concluded that that there is no significant improvement in financial and operating standards in post-merger period. The results have been arrised from paired sample t-test at significant level of 95% which indicated that there is no significance difference in the defined financial performance standards between pre-merger and post-merger due to the significance value is greater than 0.05. Hence, this study has accepted the null hypotheses which consider that there are no significant improvements in surviving company's performance post-merger and acquisition and rejected the alternative hypothesis which considers that there is significance improvement in surviving company's performance post-merger and acquisition activity

## REFERENCES

- Van Arkel, W.G. and M.G. Boots, J.C Jansen. Designing indicators of long-term energy supply security. Energy Research Centre of the Netherlands ECN, 2004. Arrow, Kenneth J. «Vertical integration and communication. » *Bell Journal of Economics* 6, n° 1 (1975) : 173-183.
- <http://www.jstor.org/stable/3003220>. Beamish, Paul W. et Andrew C. Inkpen. « Knowledge bargaining power and the instability of international joint ventures. » *Academy of Management Review* 22, n° 1 (1997) : 177-202. Harrigan, Kathryn. «Matching vertical integration strategies to competitive conditions. » *Strategic Management Journal* 7, n°6(1986): 535-555. Harrigan, Kathryn Rudie. «Joint venture and global strategies. » *Columbia Journal of World Business*(1984) : 7-16. Pirog, Robert.
- The role of National oil Companies in the International Oil Market. CRS Report for Congress. 2007. Rao, Ambar G. et Melvin F. Shakun. «A normative model for negotiations. » *Management science* 20, n° 10 (1974) : 1364-1375. Van der Linde, Coby. *The State and the International Oil Market. Competition and the changing ownership of crude oil assets. Studies in industrial organization.*
- Boston : Kluwer Academic Publishers, 2000. Yan, Min-Rei. «A fuzzy logic enhanced bargaining model for business pricing decision support on joint venture projects. » *Journal of Business Economics and Management* 12, n° 2 (2011) : 234-247.
- Bruner, R.F., (2004), *Applied Mergers & Acquisitions*, John Wiley & Sons, Inc. New Jersey.
- V. Pawaskar (2001): 'Effect of Mergers on Corporate Performance in India', *Vikalpa*, Vol.26, No.1, January – March, pp 19-32
- Ghosh, A., (2001): 'Does operating performance really improve following corporate acquisitions?' *Journal of Corporate Finance* 7 pp 151-178
- Weston, J.F., and S.K. Mansinghka, (1971): 'Tests of the Efficiency Performance of Conglomerate Firms', *Journal of Finance*, September, pp 919-936
- Pramod Mantravadi and A Vidyadhar Reddy, (2008): 'Post-Merger Performance of Acquiring Firms from Different Industries in India', *International Research Journal of Finance and Economics* ISSN 1450-2887 Issue 22 (2008)
- Kumar, R., (2009), 'Post Merger Corporate Performance: An Indian Perspective', *Management Research News*, vol. 32(2), pp. 145-157.
- Malatesta, P.H., (1983), 'The Wealth Effect of Merger Activity and the Objective Functions of Merging Firms', *Journal of Financial Economics*, vol. 11(1-4), pp. 155-181

- Ghosh A., Das B., (2003), 'Mergers and Takeovers', *The Management Accountant*, vol. 38(7), pp. 543-54
- King, D., D. Dalton, C. Daily and J. Covin, (2004) "Meta- Analysis of Post-Acquisition Performance: Identifications of Unidentified Moderators", *Strategic Management Journal*, February, pp. 187-201.
- Healy, Paul M., Krishna G. Palepu and Richard S. Ruback, (1992) "Does Corporate Performance Improve after Mergers?", *Journal of Financial Economics* 31, pp. 135-75.
- Ramaswamy, K. and J. Waagelein, (2003) "Firm Financial Performance Following Mergers", *Review of Quantitative Finance and Accounting* 20, pp. 115-126.
- Malhotra, S. and P. Zhu, (2006) "Shareholder Benefits and Firm Performance: an Empirical Analysis of International Acquisitions by Firms from a Developing Economy", *Working Paper Series*, available at: [www.ssm.com](http://www.ssm.com).
- K Ramakrishnan, (2008) "Long-Term Post-Merger Performance of Firms in India", *Vikalpa*, Vol. 33, No. 2.
- Ravichandran, K., Mat nor F. & Mohd Said R. (2010) "Market Based Mergers In Indian Banking Institution's", *International Research Journal of Finance and Economics* 37(March):30-39
- N. M. Leepsa & Chandra Sekhar Mishra, (2012), "Post Merger Financial Performance: A Study with Reference to Select Manufacturing Companies in India", *International Research Journal of Finance and Economics* ISSN 1450- 2887
- Caves, R.E. (1989), *Mergers, Takeovers and Economic Efficiency: Foresight vs. Insight*, *International Journal of Industrial Organization*, 7:151-174.
- P. L. Beena, (2004): 'Towards Understanding the Merger Wave in the Indian Corporate Sector – A Comparative Perspective', working paper 355, February, CDS, Trivandrum, pp 1-44.