

NATIONAL OIL COMPANIES: BUSINESS MODELS, CHALLENGES, AND EMERGING TRENDS

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Abstract

This paper provides an assessment and a review of the national oil companies' (NOCs) business models, challenges and opportunities, their strategies and emerging trends. The role of the national oil company (NOC) continues to evolve as the global energy landscape changes to reflect variations in demand, discovery of new ultra-deep water oil deposits, and national and geopolitical developments. NOCs, traditionally viewed as the custodians of their country's natural resources, have generally owned and managed the complete national oil and gas supply chain from upstream to downstream activities. In recent years, NOCs have emerged not only as joint venture partners globally with the major oil companies, but increasingly as competitors to the International Oil Companies (IOCs). Many NOCs are now more active in mergers and acquisitions (M&A), thereby increasing the number of NOCs seeking international upstream and downstream acquisition and asset targets.

Keywords: National Oil Companies, Petroleum, Business and Operating Models

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Introduction

National oil companies (NOCs) are defined as those oil companies that have significant shares owned by their parent government, and whose missions are to work toward the interest of their country. The traditional mission of a NOC has been to allow strategic investors, as co-owners and service providers, access to its home country's hydrocarbon resources. The governance dictates that NOCs own and manage the supply chain of oil and gas in the home country from upstream to downstream. The primary driving factors of investment between NOCs and international oil companies (IOCs) are the provision of access to hydrocarbon resources, knowledge transfer of leading-edge technology, engineering expertise, and managerial and project management skills. In addition, however, as exemplified in Venezuela and Russia, NOCs may be used to promote both social and political agendas as well as economic ones. A Chinese NOC's failure to acquire a U.S. company (UNOCAL) with international assets sends a signal that NOCs must do greater political due diligence when undertaking cross-border mergers and acquisitions (M&A). M&A has always been a factor in boosting growth in the oil and gas sector. The Merger Market gives figures of \$423 billion for 2010 and \$408 billion for 2011 in the energy sector, out of total global M&A of \$2,277 billion and \$2,237 billion (Mitchel et al., 2012).

NOCs come in a variety of forms, but most have both upscale (exploration and production "E&P") and downscale operations (refining and marketing). NOCs

historically have mainly operated in their home countries, although the evolving trend is that they are going international. Examples of NOCs include Saudi Aramco (the largest integrated oil and gas company in the world), Kuwait Petroleum Corporation (KPC), Petrobras, Petronas, PetroChina, Sinopec, StatOil, and Malaysian NOC.

Asian state-owned companies of NOCs, most prominently from China and India, are at the forefront of strategic cross-border investments as their governments seek to prepare for long-term energy supply challenges. At the same time, increasing oil wealth brought about by rising oil prices has encouraged governments as diverse as Russia, Venezuela, Bolivia, and Ecuador to give greater political and economic leverage to their national energy champions. This is achieved in their local market through revisions to constitutional laws, contracts, tax and royalty structures. Also, the NOCs have begun to enter the international market, engaging in strategic investment activities and acquiring full or partial control of foreign companies, in sectors of strategic interest for national development.

Within the Gulf Cooperation Council (GCC) region, there are a number of NOCs that have capabilities to expand beyond serving their domestic markets. This process is, in part, being hindered by the inadequacy of corporate structures and the lack of information in the GCC region. Globally, it is being hindered by the rise of economic nationalism and the debate around economic sovereignty, security, and ownership of assets, and the perception in the west

that NOCs should not seek to acquire IOCs and assets. Undoubtedly, political considerations influence and impact the international investment policy of NOCs.

The emerging trend driven by the rise of NOCs has shifted the balance of control over most of the world's hydrocarbon resources. In the 1970s, the NOCs (super majors) controlled less than 10% of the world's hydrocarbon resources, while in 2012 they control more than 90%. This shift has enabled NOCs to increase their ability to access capital, human resources and technical services directly, and to build in-house competencies. Further, NOCs have been increasing their ability to conduct outsourcing activities for many operations through the oilfield services companies (OFSCs), thus increasing their range of competence.

Moreover, the shift of the NOCs business models poses challenges for IOCs and independents by questioning the sustainability of their resource-ownership business model. Among these challenges are the production declines in existing oil fields, the difficulty of replacing oil and gas reserves in limited or restricted access areas, the rapid depletion of conventional or easy-to-access oil reserves, increasing production costs of unconventional resources, and the decline of their operating profit margins.

A number of key trends in NOCs' activities at the international level are emerging:

- With more access to capital and the development of in-house expertise, there has been a movement from being upstream producers to fully integrated energy companies;
- High oil prices, improved NOC management techniques, and access to capital markets mean that NOCs now have the financial resources to bid for, and complete, major international acquisitions;
- While major global oil companies may be fearful of investing in unstable areas of the world or where international sanctions have been imposed, NOCs' decision making merely has to be compatible with national policy and is unlikely to be hindered by corporate governance requirements and stakeholder action;
- NOCs are better able to mitigate overseas political risks through government-to-government relationships and negotiation strategies;
- NOCs can tolerate international political risk because domestic operations are likely to be unaffected; and
- Consortia exclusively led by NOCs are an emerging trend that will greatly impact the global oil and gas sector.

Despite these business and marketplace advantages, NOCs are not necessarily disciplined by the marketplace and, therefore, relative to IOCs, have a tendency to make economically-inefficient decisions. They also have the tendency to tolerate underproductive labor and staff bloating or, potentially, graft and other abuses on the part of

national leadership. NOCs do, indeed, have many advantages relative to private corporations, most notably the political muscle of their parent government. Also, they usually at least have greater access to capital and the potential to take greater risks without fear of "betting the company."

Nevertheless, to truly be successful, NOCs should function with the discipline of a well-managed private firm and, wherever possible, segregate their national responsibilities to avoid the potential inefficiencies. If they have larger social objectives, these should be clarified and costed out so that fraud and abuse are avoided while social objectives are pursued in a cost-effective manner.

All this being said, there is indeed a rise in the NOCs, which are increasingly looking like international corporations with the full panoply of resources and with the special asset of carrying the imprimatur of their parent nation.

This paper will review and discuss the NOCs business models, challenges and opportunities, their strategies and emerging trends.

NOCs' Business Models

Business models are generally used to capture the economic logic for aligning internal decisions in view of external conditions. They are typically used by corporate executives as explanatory, but not predictive, tools for sound decisions and effective management practices.

As was noted earlier, most of the world's oil reserves are totally owned by national entities or partially owned by governments that coordinate oil exploration, development and extraction of the hydrocarbon resources in their countries, and in some cases outside their borders. NOCs differ in many respects; there are NOCs of net oil importers and exporters. They differ in their evolution, relation to their governments, accountability, efficiency, international presence, degree of integration, size, etc. The expansion of scope of business suggests that some NOCs be renamed the International-National Oil Companies (INOCs) because they may operate across the globe, and certainly beyond their national borders. INOCs also have similar functions to IOCs in terms of structural, financial and operational aspects. We will use NOC and INOC interchangeably. In recent years, INOCs have begun to bridge the gap and catch up with IOCs. This convergence is changing the landscape of the global oil and gas industry by both collaboration and competition.

NOCs have four key elements for success in the upstream oil and gas sector: access to capital, access to technology, breadth of capabilities and partnerships, and effective domestic engagement. In recent years, NOCs, relative to IOCs, have made more progress in innovative technologies. A common metric for innovation is a company's R&D expenditure. Some NOCs also are true innovators.

Saudi Aramco, Petrobras, Petronas, and the Chinese NOCs all have in-house R&D capabilities. PetroChina stands out as the top spender in absolute terms on R&D in 2012 among all oil and gas companies. Table 1 shows that IOCs historically have a competitive edge over NOCs, but the gap is now shrinking, and in some respects is reversed.

The emerging trend posed by the rise of NOCs has shifted the balance of control over most of the world's hydrocarbon resources. In the 1970s, the NOCs (super majors) controlled less than 10% of the world's hydrocarbon resources, while today (2012) they control more than 90%. This shift has enabled NOCs to increase their ability to access capital,

human resources and technical services directly, and to build in-house competencies. Further, NOCs have increased the direct outsourcing of many operations through their oilfield services companies (OFSCs), rather than turning to IOC partners. As a result, IOCs and independents are facing new challenges to remain relevant to the NOCs, even in the most technologically difficult projects. Based on the growing wealth and expertise of NOCs, IOCs are increasingly focused on larger and more complex projects, such as Arctic drilling and production in unconventional oil and gas fields. The larger independents usually follow the same strategic path but with smaller scale projects.

Table 1. Comparison between IOCs and NOCs

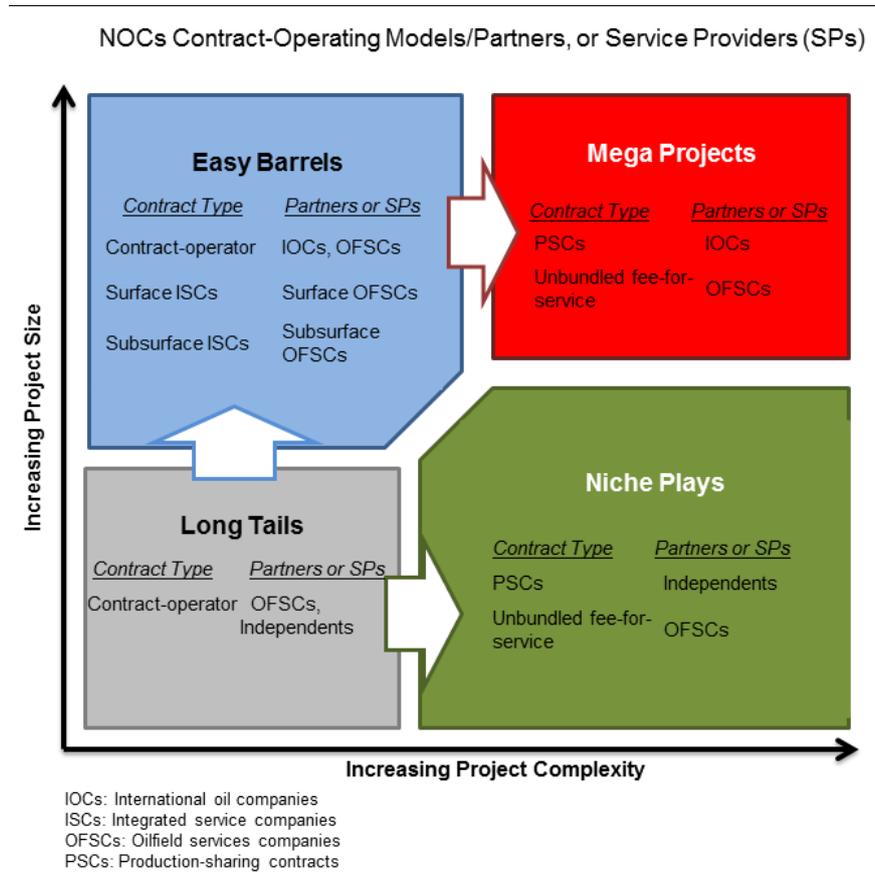
	IOCs	NOCs
1) Access to capital	✓ Publicly floated companies with access to liquid stock markets, banks and bond buyers	<ul style="list-style-type: none"> • State-backed • Increased access to equity and debt in global capital markets
2) Standard technology	✓ Leaning toward low R&D expenditures that drive down costs in complex development environments	<ul style="list-style-type: none"> • Rapid growth of R&D technology and innovation. • Increase of R&D budgets.
3) Breadth of capabilities and partnerships	<ul style="list-style-type: none"> ✓ International focus. ✓ Partnerships with governments, NOCs, OFSCs and other IOCs. 	<ul style="list-style-type: none"> • Primarily domestic focus of operations (for NOCs with domestic resources). • Expanding businesses globally. • Partnerships with IOCs, Independents and OFSCs.
4) Effective local engagement	<ul style="list-style-type: none"> ✓ Developing models for local engagement by necessity. ✓ More diverse international workforce. 	<ul style="list-style-type: none"> • Operating mostly in their domestic market, and globally to access resources. • Attracting international workforce.

Modified by author from Bain & Company, 2009

Figure 1 illustrates the NOCs' contract types and their partners or service providers with respect to project complexity and size. The mega-projects are characterized by high complexity and very large size. NOCs partner with IOCs to conduct these production-sharing contracts (PSCs). These mega-projects can also be conducted using unbundled fee-for-service

contracts in partnership with OFSCs. Examples of this type include Saudi Aramco's agreement with Chevron to develop heavy oil fields, Total's joint venture with Saudi Aramco to build Al-Jubail refinery to process heavy oil, and Rosneft's deal with ExxonMobil in the Arctic.

Figure 1. A matrix of NOCs' operating models showing their different contract types and partners or service providers with respect to project complexity and project size.



Source: Modified by author from Bain and Company.

Moreover, the shift of the INOCs business model toward aggressive international resources acquisition poses challenges for IOCs and independents by questioning the sustainability of their resource-ownership business model. Among these challenges are the declines of production in existing oil fields, the difficulty of replacing oil and gas reserves in limited or restricted access areas, the rapid depletion of conventional or easy-to-access oil reserves, increasing production costs of unconventional resources, and the decline in the operating profit margins. As a result, investors are questioning the IOCs' ability to maintain their ownership-business model as their market and net asset values decline. In addition, the competitive advantage of IOCs is increasingly threatened by NOCs' development of internal technological capabilities and transformation into international-national oil companies (INOCs). NOCs are becoming a new competitor with some advantages. In the future there are likely to be three types of major oil companies: IOCs, NOCs, and INOCs, with the INOCs being defined as primarily those NOCs whose parent countries are oil-resource-poor. But, NOCs would

also include those whose parent countries are rich in oil resources, even if they do choose to engage in international investments. Table 2 presents the objectives and characteristics of each type.

The major challenge for NOCs when dealing with OFSCs is managing the risk associated with integrated service contracts (ISCs). OFSCs are developing more end-to-end solutions and improving their technology competencies to support better unconventional and frontier locations. For example, Baker Hughes opened a research center with Saudi Aramco in Dhahran, Saudi Arabia. This R&D center focuses on understanding and developing unconventional oil and gas reserves, especially shale gas and tight gas. Similar to CNOOC and Sinopec to gain new technical capabilities, Saudi Aramco acquired Frac Tech International in late 2011. The greatest challenges for OFSCs are setting the optimal mix of ISCs in their portfolios of operations, and investing in technology and building capabilities to address a large and diverse customer base from IOCs and independents.

Table 2. Types of Emerging Major Oil Companies

	IOCs	INOCs	NOCs
	Seeking reserves and production growth in competition with other IOCs and now INOCs.	Primarily NOCs whose parent countries are oil-resource-poor. More direct competition with IOCs in multiple geographies.	Continue development of enormous domestic reserve base; parent countries are rich in oil resources.
1) Access to capital	✓ Free access to market capital.	<ul style="list-style-type: none"> ▪ State-backed ▪ Increasingly free access to capital markets. 	<ul style="list-style-type: none"> • State-backed.
2) Standard technology	✓ Long established, in-house R&D – looking for leadership position.	<ul style="list-style-type: none"> ▪ Improving in-house R&D capabilities. ▪ Increased R&D investments. 	<ul style="list-style-type: none"> • Partnerships with tech-savvy IOCs/INOCs/OFSCs.
3) Breadth of capabilities and partnerships	<ul style="list-style-type: none"> ✓ Long history of partnerships in multiple environments. ✓ Coming to terms with new partners. 	<ul style="list-style-type: none"> ▪ Improved partnering capabilities. ▪ Strategic differentiation on key capabilities and partnerships. 	<ul style="list-style-type: none"> • Alliances with best-in-class IOCs and OFSCs as required.
4) Effective local engagement	✓ Long history of societal engagement at multiple levels.	<ul style="list-style-type: none"> ▪ Developing skills in local engagement in diverse locations. 	<ul style="list-style-type: none"> • Limited need for overseas local engagement.

Modified by author from Bain & Company, 2009

Efficiency of NOCs

Efficiency can be defined as producing crude oil and products at the lowest possible cost (including labor and materials) relative to the accessibility of the resource, within safe and environmentally sound guidelines. It is not easy to develop broad conclusions about the effectiveness of NOCs in this regard. Wolf (2009) argues that NOCs in OPEC and outside OPEC should be discussed separately. NOCs of OPEC seem to be more efficient compared with private companies due to the quality of their resources. NOCs of non-OPEC states are less efficient, in terms of labor and capital efficiency. Saudi Aramco is regarded as an efficient NOC not because of its resources but because it has had a long time to develop a leadership model, build a capable and lean staff, and create sound business relationships, as compared to, say, PDVSA or Pemex. Wolf also discussed the fundamental differences in goals, policies and data of NOCs and IOCs that often complicate any meaningful comparisons. Despite this important qualification, some studies have tried to develop general impressions of the rise of NOCs.

It is often challenging to distinguish between government policy and government ownership of a petroleum-producing organization and infrastructure. For example, governments might impose price controls irrespective of whether the resource is privately or publically owned. Therefore, some inefficiencies that might be ascribed to NOCs could be attributed to government policies rather than solely government ownership of the NOC. Many of the

NOCs found to be inefficient are based in less-developed countries and are under pressure to maximize the flow of funds to the national treasuries or provide energy security to the country. In addition, some NOCs may be viewed as inefficient because of over-staffing, insider sales, and other forms of bad business practices.

Many NOCs appear to produce less petroleum output per unit of labor or other costs than do private, investor-owned corporations. These organizations may restrict current production for several possible reasons (Hartley and Medlock 2008):

- They withhold more output because they use higher discount rates than competitive firms.
- They do not maximize economic profits alone but instead have other political and social objectives.
- They operate less efficiently, incurring higher costs in producing expensive oil.

Unlike private companies, publically-held companies frequently do not disclose sufficient information about their operations that would allow a better understanding of their activities. Constrained by this lack of appropriate data, Eller et al. (2010) compared the ability of government and private companies to generate hydrocarbon revenues, with employees, oil reserves and gas reserves as inputs. They applied both statistical and linear programming approaches to identify each organization's relative efficiency. They concluded that generally NOCs are technically inefficient because they use more employees and reserves per dollar of revenue generated by the organization. In situations where

NOCs may be required by government policy to sell more supplies to subsidized domestic markets, it is unclear whether these lower revenues reveal much about the inefficiency of the NOCs themselves.

Unlike IOCs, NOCs are not necessarily disciplined by the marketplace and, therefore, have a tendency to make economically-inefficient decisions or to tolerate underproductive labor and staff bloating. NOCs do, indeed, have many advantages relative to private corporations, most notably the political "muscle" of their parent government. Also, they usually at least have greater access to capital and the potential to take greater risks without fear of "betting the company."

For NOCs to truly be successful, they should function with the discipline of a well-managed private firm and, wherever possible, segregate their national responsibilities to avoid the potential inefficiencies noted above. If they have larger social objectives, these should be clarified and costed out, so that fraud and abuse are avoided while social objectives are pursued in a cost-effective manner.

Challenges and Opportunities

There are several key challenges and opportunities that can be identified for NOCs to secure a competitive advantage. These challenges include:

- Risk management, reporting and governance.
- Talent development and retention.
- Partnership with IOCs.
- Financial management in a multinational environment.
- Citizenship and social responsibility.
- Climate change and the environment.

Risk Management, Reporting, and Governance

With the turmoil and major risk-related events that took place in the last few years, the current environment for doing business requires NOCs to go beyond their traditional roles of exploring, producing and refining crude oil. For INOCs in oil and gas importing countries such as China, the new challenge requires the development of a global investment strategy designed to secure the hydrocarbon sources on a global basis. For NOCs in significant oil and gas exporting countries, the medium- and long-term security of demand is a top priority of concern on their agenda. NOCs in both importing and exporting countries have recently been involved in negotiations with their respective governments to address many issues, including:

- The extent of security of commodity supply and demand.
- Globalization challenges and international collaboration.
- Physical security of assets and infrastructure in the supply chain.

- Operating in remote or hostile energy domains.

This new marketplace environment has allowed NOCs to take on greater strategic, political, and legal risks than in the past. But it has been suggested that NOC executives do not feel they have a good understanding of business risk in today's environment, which brings up a new challenge for NOCs to direct their interest toward developing a more comprehensive risk management framework.

As more NOCs begin to access capital markets, they also must consider adopting international accounting standards. Furthermore, new reporting systems are needed as markets are shifting business from already established centers to new financial centers. Where New York, London and Frankfurt are well established, Dubai, Hong Kong, Singapore and Shanghai are on the rise, and Riyadh will soon join them.

Corporate governance has been a thorny issue for many NOCs. Environment, health, safety, labor, and trade are essential concerns to the people of the countries where NOCs operate. NOCs should consider these issues in their investment decisions. NOCs, perhaps so more than IOCs, have explicit and implicit social responsibilities and must expect to be held responsible for their decisions in both local and international operations. NOCs also need to be cautious about the way their actions impact public sentiment. As NOCs have access to more capital markets, the corporate governance requires NOCs to be more accountable and transparent to all shareholders, not just to their home countries or ministries.

Talent Development and Retention

The need to retain talent is becoming a burning issue for many companies, especially in the upstream sector. It was claimed (Economist, Oct 7 2006) that talent has become the most sought-after resource after oil itself but, over recent decades, the U.S. oil industry alone has laid off over 1 million jobs through M&A.

With the rise of INOCs, there is more stimulated competition between INOCs and IOCs for the limited talented pool. Simultaneously, this might encourage collaboration or partnership between companies trying to tap into the same talent resources. In 2002, the Algerian NOC collaborated with other companies to access their engineering expertise necessary to improve its operations for exporting liquefied natural gas (LNG) to Europe. Recently, NOCs in Russia, India, Libya and China have all signed collaborative agreements with several IOCs. One of the important success factors requires that NOCs may need to adapt their internal cultures to accommodate the different nationalities and generations of the workforce. The point is that expertise comes primarily from the West and NOCs tend to be at a disadvantage given where they are located and operate.

Partnership with IOCs

Some NOCs have a keen interest in expanding and globalizing their business, so partnering with IOCs is a strategic endeavor to access stronger project, management experience, and key global markets. Also, IOCs can bring new technologies, critical expertise and international experience that may not be as readily available within some NOCs. As a result, IOC-NOC relationships can lead to initiating cross-investments and building institutional knowledge in key areas of key technical proficiencies. The NOC-IOC partnerships can leverage the upstream sector to promote domestic economic development. NOCs traditionally favor long-term relationships, but their focus is shifting toward project-based, short-term agreements. For example, Saudi Aramco and Total established SATORP to develop a greenfield refining and petrochemical project in Saudi Arabia. In addition, Saudi Aramco and Dow formed SADARA to develop the Saudi Aramco-Dow Integrated Petrochemical Complex in Jubail, Saudi Arabia. China National Petroleum Corporation (CNPC) made a deal in Kazakhstan to make investments in power stations, railway lines, and chemical plants.

Another emerging trend is that NOCs in hydrocarbon-rich countries such as Saudi Arabia, Venezuela, and Russia seem to exert more bargaining power over IOCs. I.e., they are coming to have fewer opportunities than in the past in countries with large reserves. This is because NOCs have improved their expertise and have become qualified national operators, making use of OFSCs' specialized services with better deals, acquiring smaller firms to access technology and skills, and building talent and expertise through global partnerships. NOCs from large emerging economy countries with scarce hydrocarbon resources, like China and India, are seen to be harder negotiators as well in their relationships with IOCs.

Financial Management in a Multinational Environment

Over the last decade, the increase and volatility of oil prices have challenged the financial strategies of NOCs in different ways. For OPEC NOCs, more cash flow led to the acceleration of their capital spending programs. Also, this made them concentrate on developing strategies that could help secure a competitive advantage in investments, both upstream and downstream, and in domestic and global markets. In contrast, importing NOCs have raised their financial resources through a diversity of public market channels, from floating bond issues to selling equity. For example, Petroleos de Venezuela S.A. (PDVSA) issued bonds for many years through U.S. debt capital markets. In addition, in 2007 PetroChina Company Limited won approval for an initial public

offering (IPO) of shares on the local market that could rise over \$7 billion.

Although oil prices may not have high volatility in absolute terms, they have a significant impact on cash flow and outlays. This absolute impact of price volatility can make cash flow management and forecasting more difficult. Therefore, NOCs are required to confront this volatility by devising rigorous strategies for cash and risk management. As NOCs globalize, international tax planning becomes a key aspect of financial planning. NOCs will inevitably take advantage of international tax planning opportunities, double tax treaties, and differing taxation rates in countries in which they operate.

Citizenship and Social Responsibility

Like the IOCs, NOCs are expected to maintain high standards of corporate social responsibility and demonstrate care for the environment, safety and health of labor, and communities throughout the world. Among others, Saudi Aramco, PetroChina Company Limited, Kuwait Petroleum Corporation, and Oil and Natural Gas Corporation of India have announced their commitments and their obligations to corporate citizenship involving environment, health, safety and community practices. It was pointed out that IOCs and OFSCs should have to contribute more to the socioeconomic development, in partnership with the NOCs, of the countries in which they operate (Al-Falih, 2011). With the NOCs, they may be required to provide jobs, develop national talents, create national supply chains, invest in infrastructure, provide financing, and support the development of new domestic industries.

For many countries, NOC-NOC partnerships have become increasingly attractive as exporting NOCs seek long-term demand security. Within OECD countries, the oil and gas markets are largely open and liberalized with IOCs typically controlling the supply and distribution infrastructure. NOCs seeking to secure access to demand in such markets need to establish and maintain good relationships with the host countries.

Climate Change and the Environment

Climate change and the environment have recently grown in concern in many countries. NOCs must showcase their good stewardship towards the environment both in domestic and international operations, and now they must consider climate change as well as they align their environmental practices with the demands of the consumer markets. Saudi Arabia, the world's largest oil exporter, has showcased many initiatives that support actions on global warming through conducting research projects on reducing CO₂ emissions. Saudi Aramco, the largest NOC in the world, has established a carbon

management program and launched a pilot project for demonstrating carbon capture and storage (CCS) technology that could potentially be used for enhancing oil recovery (EOR). Further, King Abdullah Petroleum Studies and Research Center (KAPSARC) has studied the development of a framework for a CCS program in Saudi Arabia and its implementation strategies. A comprehensive survey was also conducted in an effort to shape climate change policy in Saudi Arabia. As Abdullah Jum'ah, the former president and CEO of Saudi Aramco, said *"I believe the petroleum industry should actively engage in policy debate on climate change as well as play an active role in developing and implementing carbon management technologies to meet future challenges. National oil companies - like Saudi Aramco- can make meaningful contributions to those efforts."* (Hammond, 2006)

Strategies and Emerging Trends

The strategies and policies of NOCs will have a substantial long-term impact on the pace of resource development in the coming years. Asian and Russian NOCs are increasingly competing for strategic resources in the Middle East and Eurasia, in some cases replacing Western oil companies in important resource development activities and negotiations. Firms such as India's Oil and Natural Gas Corporation Ltd. (ONGC), Indian Oil Corporation Ltd. (IOC), China's Sinopec, China National Petroleum Corporation (CNPC), and Malaysia's Petronas have expanded in Africa and Iran, and are now pursuing investments throughout the Middle East. Russia's Lukoil is becoming a significant international player in key regions such as the Middle East and Caspian Basin. Many of these emerging NOCs are financed or have operations subsidized by their home governments, with strategic and geopolitical goals factored into investment decisions rather than being purely commercial considerations. Strategic investment and trade alliances for emerging NOCs are also being sought on the basis of geopolitics rather than economic considerations.

The interplay between emerging NOCs, major oil-producing countries and Western consumer countries will have a large impact on future energy security and the stability of oil and gas markets, raising many questions. This is an area of research that needs to be explored further. Increasingly, NOCs are in the process of reevaluating and changing business strategies, with substantial consequences for global oil and gas markets.

Within the GCC region, there are a number of companies that have capabilities to expand beyond serving their domestic market. This process is, in part, being hindered by the inadequacy of corporate structures and the lack of information in the GCC region. Internationally, it is being hindered by the rise of economic nationalism and the debate around

economic sovereignty, security and ownership of assets, and the perception that NOCs should not seek to acquire international oil companies and assets.

Undoubtedly, political considerations influence and impact the international investment policy of NOCs. The Kuwait Petroleum Corporation is the only GCC region NOC that has integrated a scalable downstream operation in the form of the Q8 brand name in Europe; Venezuela's PDVSA acquired CITGO in the United States; however, the failed bid on the part of China's CNOOC to acquire UNOCAL of the United States in 2005 is a case in point. If an INOC is perceived to be more than just a corporate entity, then its aggressive growth will be questioned.

Within the Gulf Cooperation Council (GCC) region, some regional NOCs have displayed strategic positioning in making international acquisitions. In October 2008, Abu Dhabi's International Petroleum Investment Company (IPIC) increased its stake in Austria's OMV, from 17.6% to 19.2%. IPIC has also invested in Spain's Compania Espanola de Petroleos. Saudi Aramco has experience in investing in refineries and distribution networks abroad as a minority Joint Venture partner.

In light of these dynamics and emerging trends of NOCs, industry players (IOCs, independents and OFSCs) must reexamine two corporate strategic questions: where to play and how to compete successfully with NOCs. The strategic options for IOCs and independents include following a path independent of the NOCs, investing in becoming the partner of choice for NOCs to retain production-sharing rights, and implementing the contract-operator service model. This model involves IOCs collaborating with integrated service companies in the easy oil fields as a way to gain access to the NOCs' larger and more complex projects. OFSCs will have to constantly improve the efficacy and delivery of unbundled services, as this represents the most likely way to procure oilfield services in the immediate future. The strategic options that OFSCs are applying to succeed are: advancing and applying cutting-edge technology, providing low-end offerings competitive with other low-cost service providers, and embracing the contract-operator business model.

In summary, a number of key trends are emerging to guide NOCs' activities at the international level:

- With more access to capital and the development of in-house expertise, there has been a movement from being upstream producers to fully integrated energy companies.
- High oil prices, improved NOC management techniques, and access to capital markets mean that NOCs now have the financial resources to bid for, and complete, major international acquisitions.
- While major global oil companies may be apprehensive about investing in volatile areas of the world or where international sanctions have been imposed, NOCs' decision making merely has to be

compatible with national policy and is unlikely to be hindered by corporate governance requirements and stakeholder action.

- NOCs are better able to mitigate overseas political risks through government-to-government relationships and negotiation strategies.

- NOCs can better tolerate political risk because domestic operations are likely to be unaffected.

- Consortia exclusively led by NOCs are an emerging trend that will likely continue.

In short, there is indeed a rise in the NOCs, which are increasingly looking like international corporations with the full panoply of resources and with the special asset of carrying the imprimatur of their parent nation.

Conclusions

This paper reviewed and discussed the evolution of NOCs, including new roles, opportunities, and emerging challenges faced in the upstream oil and gas industry. The business models and characteristics for the different oil and gas companies were also discussed in the context of NOCs. It also discussed the rise in NOCs' international activities and the consequences for future supply, security, and pricing of oil.

NOCs will continue to aggressively track new opportunities for growth: in terms of reserves and revenue stemming from growing access to capital markets, increasing profits, greater participation in technology advancements, and increasingly effective project management and other technical capabilities. NOCs are now addressing new challenges that require a more comprehensive approach to risk than in the past. The successful rise of NOCs depends on their responses to new challenges that include more effective corporate governance and transparency, financial risk management, talent development and retention, and greater effort to address externalities including climate change.

NOCs are reshaping the playing field by globalizing their business portfolios and crossing national borders, implementing vertical integration in the supply chain, and attracting capital from global markets. The strategic partnerships between NOCs and super majors grant NOCs the lion's share of benefits, as NOCs diversify their foreign assets, participate in unconventional reserve development, access leading-edge technology, and attain skills and expertise.

To sum up, NOCs are on the rise because they have a number of advantages relative to IOCs. At the same time, these NOCs can still do better if they can learn a variety of practices that the IOCs have perfected, namely in dealing with different international financing and taxing authorities, cooperating with one another to utilize their most advantageous skills, finding ways to mitigate risks,

and acquiring and retaining the best intellectual capital in the most cost-effective ways.

This paper does, however, glide over some of the advantages and problems that NOCs encounter, including:

- Some NOCs might be characterized as using the political muscle of their government to yield concessions that cannot be gained by IOCs.

- NOCs can often protect their international assets through the political, and sometimes military, influence that their parent government can provide.

- NOCs, as arms of their parent governments, may be constrained by the concerns of other nations.

- NOCs have the potential to be hampered by inefficiencies and corruption, which the IOCs can avoid by employing best business practices and being exposed to a competitive marketplace.

This paper also suggests that unconventional energy is a less desirable area to be in relative to traditional oil fields. This may be the case among the GCC nations, but the reality is that oil's future is likely to include both unconventional and difficult-to-access (e.g., deep water, Arctic, etc.) sources. The IOCs, in developing expertise in these areas, as well as acquiring or partnering with firms having this expertise, are diversifying in a wise manner — and they're buying into renewable technologies as well to cover all bets.

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