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THE GLOBAL BIG OIL ON THE WAY TO BUSINESS MODEL INNOVATION?

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The paper explores the current changes in the global strategy of the elite of the international oil companies, the so-called supermajors, within the context of the potential business model innovation. The work aims to make two main contributions. First, by analyzing recent shifts in the world oil and gas industry and their implications from the perspective of changing supermajors' market positions and economic power, this paper discloses the root causes of strategic moves undertaken by today's global «Big Oil» struggling with multiple competitive threats and simultaneously adjusting to the on-going industry transformation. Second, the work defines the core features of the supermajors' business model and examines whether the newly introduced strategy characteristics could be considered as business model innovation.

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Introduction

Surprisingly for many observers, the first decades of XXI century appeared to be abundant in radical changes in oil and gas sector – the industry that is very mature by all standards and that seemed to have long-established basic technologies, relatively stable global structure and market power balance, as well as firmly-settled international geography of major production and consumption centers.

These shifts obviously could not overpass the so-called Big Oil or supermajors, the terms widely used to denote the top of the International Oil Companies (IOCs), the elite group of the largest (by market capitalization) and global (by operations scale) corporations that used to dominate the world oil and gas sector. The members of this group are usually associated with the contemporary inheritors of the legendary «Seven Sisters» (giant oil companies originating from US and Western Europe) of the International Oil Cartel that have been exercising very tight control over the world oil industry during nearly 40 years until the Energy crisis of 1970s [Yergin, 2009].

As a result of a series of global mergers and acquisitions that happened in 1990s, the number of successors of «Seven Sisters» went down to just four supermajors – *ExxonMobil*, *Chevron*, *Shell* and *BP*. After this huge scaling-up, even with the new significant players coming into the global oil game, the viability of the giants' market positions did not raise any doubts for a long time. However, some recent and very significant trends push any interested observer not only to seriously reconsider the prospects of maintaining their extraordinary influence in the world oil and gas industry, but also to analyze their ability to effectively address the new challenges of today's global economic environment.

This work aims to make two main contributions. First, by analyzing recent shifts in the global oil and gas industry and their implications from the perspective of changing supermajors' market positions and economic power, this paper discloses the root causes of strategic moves undertaken by today's global «Big Oil» struggling with multiple competitive threats and simultaneously adjusting to the on-going industry transformation. Second, the work defines the core features of the supermajors' business model and examines whether the newly introduced strategy characteristics could be considered as business model innovation.

The first section of the paper discusses the main structural shifts taking place in the global oil and gas sector and develops the notion of the supermajors' business model. The second section analyses the multiple implications of current industry changes from supermajors' perspective. Consequently, section three examines the supermajors' positions in global corporate hierarchy and

section four discloses the emerging new strategic characteristics providing «Big Oil» with sustainable competitive advantages. The paper finishes with a concluding section.

Changing global industry landscape

Tectonic shifts – the term rather characteristic of the geological science, looks particularly suitable for describing the scale and long-term importance of changes taking place during recent years in the oil and gas sector of the world economy.

The most significant of these structural changes is related to the dramatic redistribution of control over the world's oil and gas reserves in favor of the National Oil Companies (NOCs) created with State participation in major producing countries. The beginning of this trend could be traced in the late 1970s. But in the last fifteen years it has been getting serious acceleration and found its logical completion. By 2012 the NOC's share in the world's total oil and gas reserves achieved the level of about 90 per cent while in 1970s 85 per cent of these reserves had been under direct control of Seven Sisters and the NOCs' share was less than 10 per cent [Menenberg, 2013a].

Another fundamental change is connected with relocation of the main centers of consumption of energy resources in general and oil and gas resources, in particular, from Western countries (above all from the USA and Western Europe) to the East and particularly to China and India. According to the International Energy Agency, the share of OECD countries in consumption of energy resources fell down from 60 per cent in 1975 to 45 per cent in 2010, and by 2035 it is expected to decrease even further - to 30 per cent. By this time only China and India are expected to consume more energy resources than all OECD countries taken together [IEA, 2012].

One more change, very significant and much more versatile by its implications, is closely linked with the so-called shale revolution. This term is now widely used to denote large-scale spread of the new set of extraction technologies (on the basis of horizontal drilling and hydraulic fracking) which gave rise to huge expansion of oil and gas production by involving oil- and gas-rich shale rock layers never touched before. In the last few years shale technologies have already brought about the unprecedented boom in oil and gas production in the USA allowing the country to achieve leadership positions in the area globally. It meant inter alia that more than a half of US demand for oil is now met from domestic sources and consequently oil imports has dropped dramatically. And though the scale and potential structural effects of shale revolution in other countries are still heavily debated, the further international spread of shale technologies and their increasing influence on global Oil and Gas industry and world trade have ceased to raise any doubts [PWC, 2013].

The next important change concerns the radical increase of gas component in the balance of production and consumption of hydrocarbons and related globalization of gas market. This globalization trend, in its turn, is closely linked with one more technological breakthrough, namely the spread of gas liquefaction technologies allowing transportation of liquefied natural gas (LNG) by specialized tanker fleet to virtually any point of the globe. As a result, the international gas market traditionally composed of relatively isolated continental segments (each covered by more or less dense network of transborder gas pipelines) is quickly transformed into truly global market.

The last but not the least structural change goes beyond hydrocarbons markets and should be considered from the perspective of the growing role of the so called renewable energy sources. During the last fifteen years the governments of Western developed economies spent billions of dollars subsidizing the development of these renewables (particularly solar and wind energy, the use of biomass as alternative fuel, etc.) within the framework of their “green” or “low-carbon” policies. Many observers were very skeptical about the outcomes of these policies stressing that renewables would never be competitive on price with conventional fossil fuels. But situation has changed dramatically very recently when the new much cheaper generation of solar and wind energy equipment has come to market making at least some of renewables cost competitive without any government subsidies.

The implications of these structural shifts from the perspective of changing supermajors’ competitive positions and their influence within the global oil and gas industry are manifold and far from unambiguous. But if one is to assess the role of supermajors in these developments in general, it would be rational to conclude that the fundamental changes have been realized rather against the will and intentions of these previously almighty giants. Moreover, the most important shifts were either directly contradicting their interests or at least didn’t support their long-term market positions.

Basing on these trends a growing number of serious business analysts started to talk about the “dawn” of supermajors, about their obsolete business model and their inevitable transformation (or degradation) into some far less important and sizable entities.³ Summarizing most of the criticism that has been recently poured down on supermajors’ business model one may notice that the biggest complaints could be reduced to just six main arguments.

Firstly, the actual loss of direct access to the main sources of hydrocarbons located in developing countries (which for decades was one of the fundamental competitive advantages of

³ Cf. Supermajordammerung: The Day of the Huge International Oil Company is Drawing to a Close. *The Economist*, August 3, 2013; Are the Supermajors Losing Ground? *Petroleum Economist*. 17 October, 2013; Tolgay S. The Decline of the “Supermajors”. *America and the global economy*. August 15, 2013; Menenberg A. The Death of the Independent Oil Company is on the Horizon. *EconoMonitor*, September 4, 2013; Lewis M. *Toil for Oil Spells Danger for Majors*. Kepler Cheuvreux, Paris, 2014.

supermajors) coupled with the increasing competitive power of NOCs based in these countries largely destroyed the traditional scheme when the global giants were able to control the costs of reproduction of their reserve base and consequently to secure the target parameters of their financial performance.

Secondly, the on-going relocation of main centers of hydrocarbons demand to the East (in the zone of NOCs' dominance) undermines to a considerable extent the importance of supermajors' global scale of operations as it puts under question their traditional role of the key chain compensating by their global network the geographic gap between the main centers of production (traditionally in developing world) and the main centers of consumption of Oil and Gas resources (traditionally in the West).

Thirdly, the huge size and hierarchical corporate structures typical for supermajors appeared to be very hard to fit into lean management organization needed in the shale plays - the most perspective (in terms of hydrocarbons' reserves) and fast-growing segment of upstream production requiring accelerated decision-making and flexible operations management at micro-level.

Fourthly, the rapid increase of gas component in the overall volume of supermajors' production discovered significant gaps in available international transport and marketing infrastructure, needed to meet the specific requirements of global gas business.

Fifthly, the further growth of cost-competitive renewables will be sooner or later ousting fossil fuels from the energy balance, starting from power generation of developed market economies, thus increasingly squeezing supermajors out of the key global energy markets.

Finally, the complicated overlap of all these issues taking place at the background of slow growth of supermajors led to largely unexpected negative trends in their stock assessment by international financial markets. The dynamics of their stock market value is more and more falling behind the other less sizeable players of the world oil and gas industry, which according to investment analysts could be explained by the higher risks and their decreasing capabilities to meet expectations of capital markets.

Analysis of the real "weight" of these arguments, frequently used to prove «inadequacy» of supermajors' business model in today's fast-changing world, takes a number of steps. The first of them seems to get clarity of the fundamental constituents of a business model in general. Though the very notion of business model (BM) is still hotly debated [cf. Foss, Saebi, 2015; Afuah, 2014; Kaplan, 2012; Johnson et al. 2008, Osterwalder, 2004, Magretta, 2002], it is fair to argue that the development of this category has gone very far from what was originally interpreted as some free-form summary of the basic economic activities of a particular business. Despite noticeable divergences on some

important aspects it is now emerging as a more and more coherent concept of concise business architecture focused around creation, proposition, delivery and capturing of customer value [cf. Shafer et al. 2005; Teece, 2010; Amit, Zott, 2012]. From our perspective, it would be possible to define business model as a system of interconnected characteristics, fundamental for any business, namely: (1) a mode of creating and delivering user value for a target customer group, (2) a mode of generating profit, (3) a mode of combining existing resources and processes to organize effective interaction of both mechanisms (user value creation and profit generation), in order to create sustainable competitive advantage. These fundamental characteristics, in essence laying down the entire “logic of a business”, are the main constituents of a business model.

When trying this definition on supermajors one would immediately notice a number of their specific fundamental characteristics, including the **global approach** to the process of value creation for the **customers of crude oil, gas and petroleum products all over the world** based on **gigantic international network of oil and gas assets** integrated in one single chain of exploration, production, refining, transportation and marketing of hydrocarbons (**vertical integration**). This business model served supermajors pretty well during many decades and might be considered as one of the most durable in the history of modern capitalism. And if it is really about to change, this would definitely have profound impact on all significant market players and the structure of the global industry as a whole.

Supermajors between the millstones

The obvious question coming to mind in this context could be formulated as follows: what has actually changed in the way the supermajors' business model operates, as a result of structural shifts within the global oil and gas industry in recent years? From this perspective, the radical redistribution of direct control over the main sources of raw hydrocarbons is of course the most serious change. After the wave of nationalizations of production assets in the major oil-producing countries in the 1970s, for some time it seemed as though the supermajors would maintain their dominant positions in global oil production by means of the so-called non-equity forms of control. Indeed, instead of traditional expansion through direct investment in production subsidiaries owned directly by the parent companies, in many cases they set out to sign agreements with the governments of producing countries to set up joint ventures and to conclude production-sharing agreements to secure actual control over the main sources of raw hydrocarbons [UNCTAD, 2007, pp. 104-105]. However, the subsequent course of events showed that such a strategy was not able to guarantee a stable position for Western giants in the long term. The Governments of oil-producing countries have decided to supplement the

formal sovereignty over their natural resources with real control instruments and set out to establish powerful national oil companies (NOCs) which gradually started to displace the supermajors from their traditional spheres of investment in the global oil and gas industry.

To some extent the supermajors have even unwittingly helped to strengthen national oil companies when, in trying to improve the efficiency of own internal structures, they started to spin off oilfield service assets as independent businesses and later sell them to third parties. In many cases it was these detached business units that became the basis for creating an extremely dynamic group of multinational oil service corporations (*Schlumberger, Petrofac, Halliburton, Baker Hughes, Weatherford, Transocean* and others) which fairly quickly started not only to collaborate, but also to successfully compete with their own former “parents”, especially when NOCs were eager to get technologies and skills not burdened with demands of access to production assets. “A shift in control over oil and gas assets away from so-called IOCs (western-owned independent oil companies) to NOCs (national oil companies),” argues *Petrofac* CFO, Tim Weller, “has left oil services companies well positioned to fill the skills gap created by sovereign states wishing to maintain formal control over their assets rather than simply hand them over to western oil majors”.⁴

It is difficult to overestimate the contribution of multinational oil service companies to the development of NOCs' technological and management capabilities. However, persistent efforts taken by NOCs themselves to strengthen their own market power and active support from the governments of their home countries have certainly played a decisive role. Analysis of the key “competitive assets” which have traditionally determined the superiority of the supermajors over NOCs has recently shown that most of these advantages are progressively disappearing. In technological field, the area where not long ago the dominance of «big oil» was virtually unquestionable, one has to recognize that from 2005 the top five NOCs were increasing their R&D budgets twice as fast as the group of supermajors, and in 2011 their investment in R&D significantly outstripped the corresponding investment of the supermajors in absolute terms (5.3 billion USD compared with 4.4 billion). Such substantial investment generated quite tangible results. For instance, the Norwegian NOC *Statoil* is now widely known as the global leader in Arctic shelf oil production technology. The Brazilian NOC *Petrobras* is unrivalled in the deepwater extraction technology segment. The Saudi NOC *Saudi Aramco* achieved widely recognized success in the development of technologies to capture sulphur in crude oil processing and technologies for capturing and storing carbon to minimize emissions.

⁴ *The Financial Times*, October 8, 2012.

Today's NOCs are very successful at competing on the global capital markets, where previously it was the supermajors which traditionally occupied the strongest positions. Indeed, in the first half of 2012 three of the largest NOCs (*PetroChina*, *Rosneft* and *Petrobras*) were able to raise more than 27 billion USD on the global financial markets, while all the supermajors could only raise about 10 billion USD in the same period. In fact, NOCs often enjoy even more favorable conditions when it comes to attracting financial resources. For instance, the six largest publicly-traded NOCs have achieved a price to earnings (P/E) ratio per share close to 10, which is significantly higher than the P/E ratios for the supermajors (which are less than 7) [Bain & Company, 2012, p. 2]

Finally, leading NOCs have made significant progress in building modern corporate management systems and in globalizing their operations, the areas which were traditionally considered to be the supreme domain of the supermajors. The majority of the largest NOCs are now vertically integrated extraction, processing and marketing complexes with latest operational management systems, including a streamlined organizational structure, integrated management of exploration, extraction, processing and marketing blocks, advanced supply chain management and ERP-type management accounting systems.

NOCs are actively chasing qualified executives with work experience in supermajors and willingly spend a fortune when hiring leading international consultancy firms and world-class experts to implement management best practices and business processes. Many NOCs are quickly starting to look very much like the supermajors in terms of their level of internationalization. The Norwegian *Statoil*, for example, has at its disposal a network of production and processing entities in 41 countries, the Malaysian *PETRONAS* in 35 countries, *Kuwait Petroleum* in 23 countries, and the Brazilian *Petrobras* in 22 countries.

The transfer of control over a major part of global oil and gas resources into the hands of NOCs and the growth in their competitive might have closely interwoven with other trends that could by no means improve the positions of the supermajors. One of these trends relates to the current visible relocation of the key hydrocarbon consumption centers from the West to the East, a trend that is very connected with the rapid growth in per capita income in the leading Asian countries and their transformation into a new “global factory”. As duly noted by the US analyst, Aaron Menenberg, “all the projections acknowledge that the growth will occur in the NOC-dominated developing world where IOCs have increasingly limited access to, or are already locked out of, future production opportunities, limiting their opportunities to supply burgeoning markets” [Menenberg, 2013a].

The “shale revolution” has been an extremely serious «stress test» for the supermajors, one which they strangely enough almost overlooked. It was predominantly small and medium-sized business, that have been the main driver behind the shale boom in the US and that have been able to skim the creams of it. Consequently the supermajors, clearly the latecomers to the start of this game, were forced to vastly overpay when they finally decided to buy out the assets of some of the leaders. Thus, contrary to its reputation of an overcautious company, *ExxonMobil* decided in 2009 to acquire the dynamic US shale gas producer *XTO* for the astronomical sum of 41 billion USD. However, following a quick fall in gas prices on the US market, it had nothing to do but to accept the sharp drop of value of this investment. *Shell* found itself in a similar situation after being forced to write off 2.1 billion USD, when it decided to sell its recently acquired shale assets in *Eagle Ford*, one of the most promising US gas-bearing formations in Texas.⁵

The changes in the distribution of power taking place within the framework of the globalization of gas market can hardly be considered as positive for the supermajors either. It goes without saying that in many ways they actually initiated the accelerated development of gas resources, trying somehow to offset the narrowing access to oil reserves. As a result, by 2012 the share of gas in the supermajors' hydrocarbon production rose on average to more than 40%, and in case of *ExxonMobil* to almost 50% [Tolgay, 2013]. It would be important to bear in mind that the supermajors were at the origin of the development of LNG production and transportation technology⁶. And at first, in view of the complexity of LNG projects from the perspective of setting up the international supply chain and the huge capital investment needed to construct LNG plants and to build necessary infrastructure and tanker fleet, it seemed that NOCs would find it far harder to compete in this area. However, dynamic growth of the capabilities in all components of LNG business demonstrated by a number of NOCs (above all by the Algerian *Sonatrach*, the Qatari *Qatar Petroleum* and the Malaysian *Petronas*) has shown that the same trend of deteriorating positions of the supermajors is also characteristic to this increasingly important segment of the global oil and gas industry. By 2008 the NOCs' share in LNG export supplies from the Middle East and the Atlantic reached 58%. Looking at the reasons for these successes in the case of the Algerian NOC, the US analysts had to admit that “... irrespective of the long-term potential exhibited by *Sonatrach* in its competition with international oil companies on the global playing field, its starting position sitting on 4.6 trillion cubic meters of proven gas reserves

⁵ *The Financial Times*, September 30, 2013.

⁶ In particular, *Shell* was a pioneer in LNG production and transportation. It was involved in the construction of the first ever LNG production plant in Algeria back in 1964.

already gives it a head start in the part of the chain that gives experienced majors a massive headache”.⁷

The overall impact of these structural shifts in the global oil and gas industry is the increasingly evident forcing the supermajors to move into some of the most difficult and costly segments of the industry. The general reduction in the number of major discoveries of conventional (i.e. relatively easy to access) oil and gas reserves is coupled with another trend - most of these discoveries are made in countries which are actively developing their own NOCs.

According to data from the reputable UK-based Energy Institute, conventional oil and gas discoveries peaked in the 1960s. And ever since the number of deposits and the amount of reserves opened up have steadily declined. But taking into account so-called unconventional reserves (primarily in shale rocks and oil sands), the total oil and gas reserves discovered in recent years have grown dynamically, from 5.5 billion barrels on average annually in 2001–2006 to 7.9 billion barrels in 2007–2011. However, out of the 40 largest discoveries (with resource estimates more than 500 million barrels of oil equivalent) in 2006–2011, 28 (or 70 per cent) of them were in countries with active NOCs. As a result, for the top ten international oil companies (based in the West), including four supermajors, the average reserve life had come down to 13 years in 2011 (and declining), compared with 78 years for the top ten NOCs [Bain & Company, 2012, p.2].

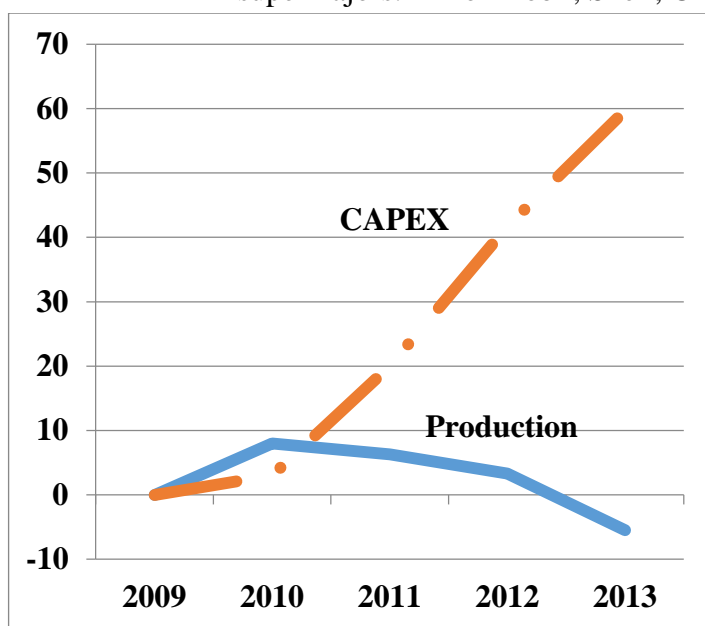
In this situation, to replenish their resource base the supermajors were simply forced to turn to hard-to-access reserves, including continental shelf oilfields and deposits in regions with tough environmental conditions and climate (for instance, in the Arctic), and to the so-called hard-to-recover reserves, including oil and gas in shale rocks and oil sands and heavy crude oil. While in 2004 heavy oil, deep-water and other unconventional oil accounted for only 17% of all *ExxonMobil's* total reserves, by 2011 their share had risen to almost 50%. Similar changes are being traced among the other global oil and gas giants [Bain & Company, 2012, p.3].

Not surprising, the shift to unconventional reserves immediately hiked the production costs and soon began to affect negatively corporate financial performance. The flip side of this turn of events was, as expected, substantial growth in capital expenditures (CAPEX) and operational costs followed by the corresponding drop in the return on capital employed (ROCE) and operating profits. According to data from Bloomberg, from 2000 to 2013 capital expenditures in exploration and production segment of the top 11 Western oil companies (including four supermajors) increased from 50 to 273

⁷ *ICIS*, 3/7/2008. URL: <http://www.icis.com/heren/articles/2008/03/07/9302816/energy-focus-an-nocs-world-ling-in-the-sellers-market.html>.

billion USD, an increase of almost 5.5 times [Douglas-Westwood, 2014, p. 50]. The main factor of this growth was the changing structure of oil and gas reserves in favor of unconventional component. However, the results of this huge growth in investment activity from the perspective of the desired increase in production turned out to be very disappointing for the global giants. A comparative analysis of the dynamics of total CAPEX and actual hydrocarbon production indicators at three of the supermajors (ExxonMobil, Shell, Chevron) over the five year period in 2009–2013 shows that the dramatic increase in investment took place simultaneously with significant fall in production numbers (Fig. 1).

Fig. 1. Trends in CAPEX and actual production dynamics, average growth (fall) for the group of three supermajors: ExxonMobil, Shell, Chevron (per cent)



Source: Gilbert D., Scheck J. 2014.

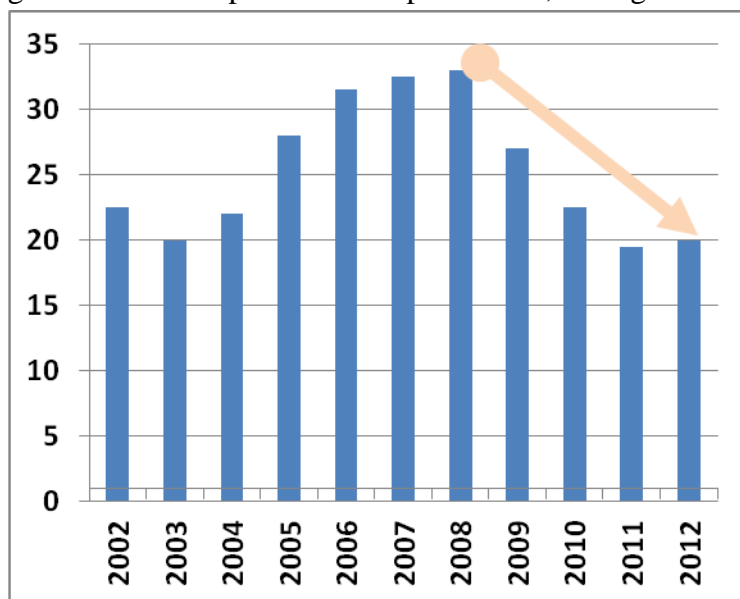
These unfavorable trends were soon reflected in financial performance, and that was taken very negatively by international investment community. It was in the same period that the group of supermajors started to show the obvious signs of falling ROCE. In the five-year period from 2008 to 2013, this indicator dropped from 33% to 20% (Fig. 2). Simultaneously there was a fall in operating profits, going down from 15% in 2006 to less than 12% in the first half of 2012.⁸ As summarized by *The Economist*, “the supermajors are increasingly reliant on oil which is hard to get at: either because of geology (oil buried deep underwater and far from any shore); or because of chemistry (oil mixed up

⁸ Bain & Company.2012, pp. 3-4.

in tar sands and the like); or because of politics (oil in countries politically difficult to deal with)... But they are spending more and more money to produce less and less of global oil output⁹.

The growing activity of the supermajors in the shale segment has revealed a whole array of issues in terms of integrating these unconventional assets into the existing structure of the global giants. The small and medium-sized oil firms, which were the pioneers in the US shale boom, developed a very specific organizational structure of a new business closely connected with the specifics of shale technologies. Whereas the supermajors, forced either to buy out the assets of one of the leaders outright or to set up a joint venture with them, acquired in addition to unconventional production technologies very different business processes which were rather difficult to “accommodate” to their well-oiled organization. In particular, these included so-called manufactured drilling, which requires streamlined decision-making system and a constant drive to make operational improvements on a micro-level.

Fig. 2. ROCE in exploration and production, average for the group of supermajors (per cent)



Source: Dylan R., Mair F. 2014, p. 50.

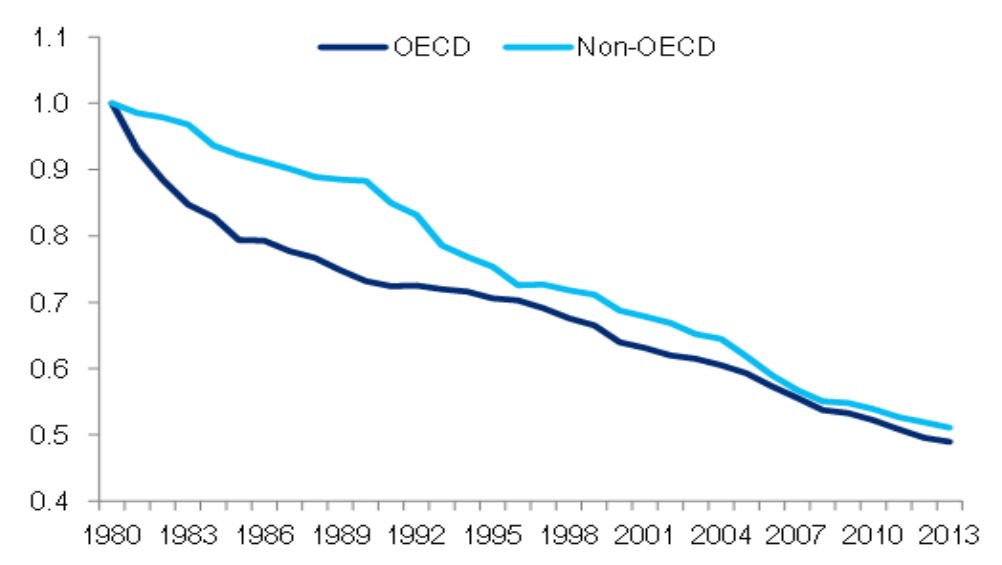
The main difficulties faced by the supermajors when adopting these types of processes are well described by the US analyst, Liam Denning: “Shale development requires intensive drilling of many wells rather than the handful common to a conventional project. That makes scale efficiencies harder... Drilling wells faster, experimenting with the number of fractures, or “fracks,” per well, and other operational tweaks are tried at field level, a micro approach that isn’t easy in a big, centralized organization”[Denning L. 2013].

⁹ The Economist. 2013, August 3.

The consequences of the structural shifts in the oil and gas industry were also rather ambiguous for the traditional vertically integrated organizational structure, which had been traditionally one of the most important characteristics of the supermajors' corporate structure for more than 100 years. The relocation of the main centers of petroleum products consumption from the West to the East led to a significant drop in the profitability of processing and distribution assets in Europe and the US (due to the growing overcapacity and the increased transportation costs). Against this backdrop, many Western analysts started to stress the issues and risks of vertically integrated structures and the declining confidence in this form of organization for oil and gas businesses within investment community. A special study by the reputable consultancy firm AT Kearney in 2011 concluded that over the previous 10 years specialist companies (both those involved in exploration and production and those involved in refining and marketing of oil products) demonstrated significantly higher ratio of market value to EBITDA and "have the potential to create more shareholder value than integrated companies" [AT Kearney. 2011, p. 4]. The practical steps taken by some of the largest US oil and gas companies to split up their formerly integrated business structures received considerable attention in the media. In particular, in 2011–2012 Marathon Oil and later ConocoPhillips split their businesses into two specialist companies – Upstream and Downstream, making other major players to seriously re-consider their vision of pros and cons of integrated structures in the industry.

One more, and may be the most difficult in the long run, challenge facing the supemajors is posed by the starting radical transformation of the global energy sector as a whole. As the recent reputable research indicates, «world energy markets are entering a period of «extreme flux», with oil caught in triple encirclement by cheap natural gas, much more efficient vehicles and breathtaking advances in solar power as scientists crack the secrets» [Evans-Pritchard A. 2014]. In fact, the oil intensity of global GDP has already halved since the 1980s (cf. Fig. 3).

Fig. 3. The Trend in Oil Intensity of GDP Indicator, 1980-2013*



*indexed 1980=1

Source: Citygroup, Inc. 2014, p. 5.

Certainly, this disturbing trend for supermajors is partly attributable to the rising global role of gas which is now taken very seriously and basically included in the new strategy of «Big Oil». But the other two factors related to raising gasoline efficiency of new cars and growing competitiveness of «clean energy» technologies are clearly developing beyond the oil giants' control. Thus, in the US the average efficiency of new cars has risen by 4.6 miles per gallon (mpg) since 2008 under fuel economy mandates and is still rising at a steeper rate. According to a forecast made by Citygroup experts, the US gasoline demand will drop by 900,000 b/d by 2020. China has even stronger restrictions coming into force, with a 50mpg fuel economy mandate by 2020. Its output of electric cars is up 177% in a year, and hybrids are up 567%. India is expected to reach 50mpg target by 2021 and Mexico by 2025.

Even if these targets are not met, the shift towards solar power is going to undermine total fossil fuel demand from another side. Citigroup research indicates that solar already competes in a number of the developed regions of the world on "pure economics" without subsidies. It has reached grid parity with residential electricity prices in Germany, Italy, Spain, Portugal, Australia and the US southwest. Japan is expected to achieve this point in 2016, South Korea in 2020 and even UK by 2021 [Citygroup, Inc. 2014, p. 41].

However, the unbiased analysis shows that despite all the challenges and negative trends in the external environment, where the supermajors are operating nowadays, they proved to be far more resilient than many of their critics predicted. In spite of huge competitive pressure from new players and evidently decreasing “weight” of their traditional competitive advantages, the supermajors'

positions among the leaders of the global oil and gas sector have remained surprisingly stable for a long time. At least, this is a conclusion which could be derived from the international corporate ratings regularly produced by the industry analysts.

Maintaining positions in corporate hierarchy

International ratings are often used to determine the positions of companies in the global corporate hierarchy. These comparative ranking lists are normally based on one or another key performance indicator. In case of oil and gas industry the top players' ratings are usually constructed on the basis of one of three parameters: market capitalization, proven hydrocarbon reserves or daily oil and gas production of oil equivalent. Each of these characteristics are important in their own way when it comes to determining the position of an individual company in the corporate universe. However, using the first two of these indicators to compare the positions of the supermajors and NOCs will face quite obvious issues.

Taking market capitalization rating as a basis, we would automatically exclude a number of major NOCs for the simple reason that they are not public companies, meaning that their shares are not traded on the stock markets. Moreover, market capitalization indicator is vastly influenced by factors which are not directly linked to the actual company's business performance (for example, the country risk factor of the home country) or which are highly subjective in nature (corporate reputation, judgements on the management's qualifications and professionalism, etc.). As such, these factors more often than not play in favor of supermajors which have many years of experience on the stock markets and are fully expected to dominate capitalization-based ratings. It is no coincidence that only one NOC from the East (*PetroChina*) managed to mount a worthy competition to its Western rivals in the capitalization ratings, literally just breaking into the top five of the list (cf. Table 1).

Table 1. Top oil and gas companies globally by market capitalization and hydrocarbon reserves

Rating based on capitalization 2013			Rating based on oil and gas reserves 2010		
Rating position	Firm	Capitalization (Bln. USD)	Rating position	Firm	Worldwide reserves, Bln. BOE
1	<i>ExxonMobil</i>	400.4	1	<i>NIOC</i> (Iran)	357.5
2	<i>PetroChina</i> (China)	261.2	2	<i>PDVSA</i> (Venezuela)	330.9
3	<i>Chevron</i>	232.5	3	<i>Saudi Aramco</i> (Saudi Arabia)	315.1
4	<i>Shell</i>	213.1	4	<i>Qatar General Petroleum Corporation</i> (Qatar)	177.4
5	<i>BP</i>	130.4	5	<i>Iraq National Oil</i> (Iraq)	160.4
6	<i>Petrobras</i> (Brazil)	120.7	6	<i>ADNOC</i> (UAE)	126.4
7	<i>Total</i> (France)	115.5	7	<i>Kuwait Petroleum Corporation</i> (Kuwait)	112.3
8	<i>Gazprom</i> (Russia)	111.4	8	<i>NNPC</i> (Nigeria)	68.3
9	<i>Sinopec</i> (China)	106.9	9	<i>National Oil Company</i> (Libya)	57.3
10	<i>ENI</i> (Italy)	86.3	10	<i>Sonatrach</i> (Algeria)	39.4

Sources: The World's Biggest Public Companies. *Forbes*. 2013; *Oil & Gas Journal*, September 1, 2014.

Even more deficiencies could be found in ratings based on hydrocarbon reserves. First, reserves by their very nature only reflect potential value in future. After all, they still need to be extracted and the extraction costs are based on very rough estimates. Second, despite the spread of internationally recognized methods developed by respectable independent audit firms working in this field, experience shows that there are plenty of ways to manipulate oil and gas reserves reporting .¹⁰

¹⁰ A striking example of this is the scandal in the global oil and gas industry in 2004 when *Shell* was twice forced to lower its official proven reserves figures, by 20% overall, or by almost 4 billion barrels. Immediately, observers started to fear that *Shell* was not the only major company to engage in such manipulation and that not only private companies, but also the governments of oil-producing countries could resort to overestimating their reserves.

Third, as far as NOCs from oil-producing countries are concerned, it would be hardly correct to consider reserves as a result of normal business activity. In this case the state actually “grants” its NOCs the right to exploit oil and gas resources on its territory in exchange for maintaining some control over NOCs’ activities and a certain share of the future revenues from the development of extracted resources.

The situation is totally different for private oil companies (and for NOCs based in oil-importing countries) as the acquisition of reserves always involves significant efforts and considerable investment, be it taking part in tenders to buy relevant licenses or acquiring other companies that already own the rights to develop the target oilfield. It is only natural that the supermajors started to lose their positions in the reserves rankings immediately after the control over oil and gas resources was passed over to oil-producing countries and their NOCs. In recent years Western giants have not even got into the top ten leaders in this area and were simply ousted to the “second tier” positions. And while the market capitalization ratings tend to put the supermajors in a better position, the oil and gas reserves ratings are even more biased, but this time in favor of NOCs from oil-producing countries.

From this perspective ratings based on production volumes look far more representative. Certainly, like most of ratings built on a single indicator, they are not perfect, but definitely more reliable and seem to provide more objective basis for comparison.

Actual production numbers are not easy to manipulate. They are virtually unaffected by subjective factors and certainly reflect one of the most important results of a company’s business activity. It is also important that the ratings of the top oil and gas companies globally based on production volumes are regularly published in *Forbes*, which makes it possible to trace the dynamics of these indicators over a long period of time (cf. Table 2).

The first thing that catches the eye when comparing the ratings of the largest oil and gas companies by *Forbes* for 2003 and 2013 is the entrenchment of oil-producing countries’ NOCs in the first rows of the global corporate hierarchy. The top three ranks are occupied by *Saudi Aramco*, the Russian *Gazprom* and the Iranian *NIOC* respectively. This is just a reflection of the huge growth in economic might of producing countries’ NOCs, primarily due to capturing effective control over the vast reserves in their home countries. However, it is impossible to ignore something else: the positions of the supermajors over the last decade remained remarkably stable. *ExxonMobil* and *Shell* still occupy strong positions in the top ten, holding on to 4th and 6th places respectively. *Chevron* dropped by just one spot, losing 8th place to the Mexican NOC *Pemex*, but is still in the top ten.

Table 2. Top oil and gas companies globally by production volume, 2003 and 2013

Rating 2003			Rating 2013		
Rating position	Firm	Production, Mln. BOE / day	Rating position	Firm	Production, Mln. BOE / day
1	<i>Saudi Aramco</i> (Saudi Arabia)	9.9	1	<i>Saudi Aramco</i> (Saudi Arabia)	12.7
2	<i>Gazprom</i> (Russia)	9.5	2	<i>Gazprom</i> (Russia)	8.1
3	<i>NIOC</i> (Iran)	4.9	3	<i>NIOC</i> (Iran)	6.1
4	<i>ExxonMobil</i>	4.6	4	<i>ExxonMobil</i>	5.3
5	<i>Pemex</i> (Mexico)	4.2	5	<i>Rosneft</i> (Russia)	4.6
6	<i>Shell</i>	4.1	6	<i>Shell</i>	4.0
7	<i>BP</i>	3.9	7	<i>PetroChina</i> (China)	3.9
8	<i>Chevron</i>	3.2	8	<i>Pemex</i> (Mexico)	3.6
9	<i>PetroChina</i> (China)	2.5	9	<i>Chevron</i>	3.5
10	<i>Total</i> (France)	2.4	10	<i>Kuwait Petroleum Corp</i> (Kuwait)	3.4
11	<i>Sonatrach</i> (Algeria)	2.36	11	<i>BP</i>	3.1
12	<i>Kuwait Petroleum Corp</i> (Kuwait)	2.3	12	<i>Total</i> (France)	2.6
13	<i>Yukos</i> (Russia)	2.2	13	<i>Petrobras</i> (Brazil)	2.5
14	<i>ADNOC</i> (UAE)	1.82	14	<i>Qatar Petroleum</i> (Qatar)	2.4
15	<i>Lukoil</i> (Russia)	1.8	15	<i>ADNOC</i> (UAE)	2.4

Source: Helman C. 2013.

The only supermajor whose position deteriorated significantly was *BP*. In terms of daily oil output, the company fell from 7th to 11th place over this period, showing an absolute reduction in its production of more than 20%. But in this case, the reason is clearly not some industry-wide structural shift, but rather the consequences of the catastrophic accident at a deep-water drilling platform in the Gulf of Mexico in 2010 when the company was forced to sell a significant portion of its assets to pay huge fines for environmental damage. In view of these circumstances, the 11th place occupied by *BP* even after selling assets worth 38 billion USD should in fact be considered as a sign of its immense durability and viability. On the whole, in the words of the US analyst, Christopher Helman, “despite the unfathomable changes the industry has seen, when it comes to who rules the roost, the more things change the more they stay the same” [Helman C. 2013].

Surprisingly stable positions of the supermajors among the main industry players suggest the conclusion that they were able to successfully adjust those elements of their business model that did not work in the shifting environment and that the newly introduced strategic changes are increasingly

demonstrating their highly competitive potential. Significant changes brought about by this adaptation process have affected a number of key aspects of the global giants' economic activities.

Business model adaptation or innovation?

By and large, the issues that the supermajors have to solve when adapting to the new environment can be classified in three main groups. First, how to guarantee reliable access to oil and gas reserve base when restoring direct control over hydrocarbon sources in the main producing regions outside Western world is no longer possible. Second, how to build sustainable competitive advantages that could be put forward to oppose the growing power of major industry players among NOCs and multinational oil service companies. Third, how to react to the long-term competitive threat of «clean energy» technologies increasingly challenging the dominance of fossil fuels, particularly in the more developed regions of the world.

To address the first of these fundamental issues, supermajors for a long time had no alternative but to search for compromises with the new players controlling the main sources of conventional hydrocarbons. This forced supermajors' to reconsider their strategic vision basing on a fundamental reassessment of the balance of power in the global oil and gas industry and basically to admit the irreversible nature of the transfer of control over most of resource base into the hands of the governments of producing countries and their NOCs (reserves located in the developing world and CIS countries). From the supermajors perspective, the acceptance of this painful role reversal required recognition of the imperative to search for compromises in order to gain access to the resource base. As experts from Bain & Company noted, "Despite their traditional advantages of larger portfolios, deeper pockets and superior technical firepower, supermajors will find it harder to operate independently due to the huge challenge of replacing their reserves... Regardless of their strategies, IOCs and independents will have to shift from a mindset that seeks maximum control to one that balances mutual interests and, above all, is about serving the customer" [Bain & Company. 2013, p.11].

It is no coincidence that one of the most important components of the supermajors' new strategy relates to the effective management of alliances to secure access to hydrocarbon resources. Little by little, global companies have managed to turn this imperative into one of the key sources of their competitive advantage. Thus, so-called integrated service contracts have become an important entry method within the supermajors' arsenal alongside traditional joint ventures and production sharing agreements. Far more important is that this expanded arsenal has been turned into an effective means to fine-tune relations with the governments of producing countries and their NOCs. In practice,

all of these conventional and unconventional alliances are carefully combined and used with due consideration of all the aspects of individual production projects, the current balance of bargaining power, qualifications and experience, as well as financial, technical and people capabilities of potential partners.

For instance, the long-term agreement concluded in 2011 between Shell and the Malaysian NOC PETRONAS in relation to the very mature Sarawak oilfields combines the elements of a service contract on enhanced oil recovery with the elements of a production sharing agreement. Another example is BP's service agreements securing access to some of the richest oilfields in post-war Iraq. This experience has already shown that the so-called risk-service contracts (with very tight deadlines for starting commercial production) may be no less profitable than the enhanced oil recovery service agreements. It is this type of new relationships that the executive vice president of BP, Dev Sanyal, referred to in his speech in September 2012: "Unlike the super-majors of the past, defined by scale, the supermajor of the future will be defined by specialist capability and the capacity to form new types of relationships" [Sanyal D. 2012].

Recently, another trend has become visible, linked to a certain re-orientation of the resource base towards unconventional reserves in developed market economies. As the profitability of unconventional extraction technology improves and LNG business develops further, the supermajors are increasingly finding themselves facing the choice: either to invest in the extraction of conventional reserves which are relatively easily accessible from a geological perspective, but which are located in the countries with a high-risk political reputation, or to increase investment in costly extraction of unconventional reserves in the countries with notoriously low political risks. And in many cases the supermajors have started to choose the second option. The logic behind their behavior is determined by standard risk management principles. "The risks in OECD are technical, but they're easier to manage than political risk," noted Simon Henry, Shell's CFO. "In the OECD, you have more control of your operations" [Chazan G. 2011]. The outcome of such an approach is quite noticeable relocation of supermajors' investment in exploration and production in developed market economies with serious growth potential in unconventional hydrocarbon reserves. Thus, while Shell's capital expenditures in exploration and production had been traditionally almost evenly split between OECD countries and the rest of the world, now this ratio has shifted to roughly 70:30 in favor of OECD countries. The lion's share of this investment ends up in Canada, Australia and the US. A similar trend in the reorientation of resource base geography can be seen quite clearly at ExxonMobile and Chevron.

The intensive growth of the shale segment in oil and gas assets gave rise to a need to implement organizational innovations in order to effectively develop these unconventional reserves. The supermajors set about introducing an essentially new operating model which had to start working in parallel with the “core” organization focused on developing conventional assets. “In order to compete in unconventional assets,” as highlighted by experts from the international consultancy Strategy &, “oil majors will have to embrace a dual operating model—in essence, pairing traditional operations with separate and more agile business units modelled after the independent gas firms, with flatter organizations, simpler governance structures, and an emphasis on efficiency and innovation” [Strategy&. 2010]. From 2006, the supermajors had already invested tens of billions of dollars into buying up the shale business of independent companies, including the acquisition of new organizational practices and, according to experts, are adopting them quite successfully [Cf. The Boston Consulting Group, Inc. 2013, p.3].

The reverse side of the shale component growth in the supermajors’ oil and gas assets was the rapid expansion of their gas business. In parallel, a global infrastructure has been built for gas transportation and marketing. The supermajors have been the main drivers of the worldwide spread of new gas liquefaction technologies deploying huge production capacities, LNG storage terminals and building a fleet of specialist LNG tankers. As a result, today Shell has perhaps the strongest infrastructure to develop the global LNG business, including equity interest in eight existing LNG export terminals, as well as a powerful fleet of 56 specialist tankers with the combined annual capacity to export roughly 20 million tons of LNG (approximately 8.5% of global trade in this sector in 2013). New LNG projects in Australia, the US and Canada should add a further 18.5 million tons to the total capacity. And the recent acquisition (in April 2015) of BG Group with its vast gas reserves, clearly indicates that gas business has already become Shell’s strategic bet for the coming years. The second largest player in global LNG segment is ExxonMobil which has a current annual capacity of more than 19 million tons of LNG. New projects should create a further 36.5 million tons of additional capacity. Chevron is also actively growing its own LNG business, working on projects which will soon provide about 19.2 million tons of annual capacity for LNG exports, mainly from Australia and Canada [Crowe T. 2013].

Another important dimension of the supermajors’ new strategic approach is a wide array of unconventional competitive advantages which have been developed in recent years in the course of fierce rivalry with NOCs and multinational oil service companies. It is exactly in this area that the so-called intangible assets, related to management skills, expert knowledge, industrial and corporate

culture, are coming to the fore. This does not mean that the supermajors are being transformed into some kind of research centers or consultancy type service entities. They continue to produce and process oil and gas and continue to sell crude oil, gas, oil products and petrochemicals. However, the mechanisms that they developed and continuously improved to secure access to oil and gas reserve base, the methods of their own global resource manoeuvring, and their ability to effectively mobilize and manage the resources of other players in the industry, provide them with such unique competitive advantages that their rivals are usually not able to reproduce.

The new competitive set of the supermajors is based on a number of instruments. One of these is an effective mechanism to manage global portfolio of oil and gas assets. In essence, this is an instrument that allows to make regular comparative assessment of all corporate oil and gas assets against a number of specified technical and economic parameters and to build an optimal mix of assets using special math models in order to achieve certain strategic objectives with due account for existing risks. The effective portfolio management allows the supermajors to raise the investment decision-making to a new level, significantly speed up this process, make it much more flexible and, essentially, integrate it with strategic planning. This approach makes it possible for today's global oil and gas market players to maintain fairly high level of overall profitability despite financial setbacks on individual risky projects.

Another new competitive asset of the supermajors relates to their unique experience in managing the so-called mega-projects to develop some of the largest oil and gas deposits, including hard-to-recover reserves. The importance of these activities for "Global Oil" lies in the fact that the relatively small number of the "large and complex" oilfields (making roughly 10% of the total number), account for half of the world's reserves. The development of such reserves, often with complex geology and extreme environment, requires operators to mobilize huge and highly risky investments, rising into the tens of billions of dollars. In this case profits will be only achievable with a set of characteristics that even the most advanced NOCs cannot put on the table. This means a combination of a strategic vision of development of the largest oilfields throughout their full life cycle (including both the underground part and ground infrastructure) and the ability to guarantee strong production performance. This in turn requires the latest production technologies, world-class planning and project management, full commitment to industry standards and constant innovation, and the introduction of best practices in operational efficiency and cost management. Not surprisingly even the NOCs with significant experience in project management willingly involve the supermajors as operators when it comes to mega-projects to develop hard-to-recover reserves.

The elements of corporate culture that ensure the supermajors' development as "learning organizations" focused on innovation, can be considered as a specific group of their new competitive advantages. The essence of the concept of "learning organization" could be generally summarized in refocusing of employees and corporate working climate as a whole on searching the opportunities to innovate and to improve all areas of business activity, including the intensive promotion of exchange of innovative ideas through a corporate-wide system of knowledge management and continuous training.

Though the supermajors are by no means the ones that invented this concept, its ideas, which spread in the late 1990s, could not have come at a better time in view of the need to react quickly to certain unfavorable industry trends, which by that time had started to seriously worry the corporate management and shareholders. This serious motivation to a large extent contributed to the successful introduction of key elements of the "learning organization" into the very heart of the specific corporate cultures of the supermajors. As a result, the management of global oil and gas companies managed to turn them into an excellent instrument to raise efficiency, generating huge savings in the amount of hundreds of millions of dollars annually. According to own BP estimates, in just one year savings resulting from exchanging ideas within the framework of a "learning organization" totaled more than 700 million USD. According to other estimates, Shell's implementation of just one of the main components of the "learning organization" concept – sharing experience within so-called global practice communities– generated annual savings of roughly 200 million USD [Gant R. 2013]. And based on data from the former Chevron CEO, Kenneth Derr, it was the successful introduction of a "learning organization" system that was a key factor in achieving significant reductions in operating costs (more than 2 billion USD) over a seven-year period [Derr K. 2010]. But even more important is the fact that due to the introduction of the elements of "learning" organization", the supermajors managed to transform their own corporate culture in such a way that it became one of the most important bases of their competitive power allowing them in many ways to be very often one step ahead of their rivals.

Finally, the supermajors' ability to secure reliable outlets for huge volumes of hydrocarbons through guaranteed access to a global network of refining capacity and global trading and marketing infrastructure could also be added to their today's most important competitive advantages. The closer look into these "downstream" aspects (i.e. aspects relating to processing and marketing), also allows to trace evolution of the fundamental characteristics of the traditional supermajor business model, such as vertical integration and global scale of operations. In particular, with regard to a vertically integrated

structure, today's supermajors, in order to maintain sustainable competitive advantage, do not rely so much on their own refining and marketing assets (the proportion between upstream and downstream assets can change significantly over time), but rather on their ability to secure reliable commodity/product flows through the entire international trading and marketing chain from the crude oil producer to the end customer. At present, this reliability is already largely based on business connections, special knowledge, experience and corporate image (which is particularly important in trading) accumulated over many years.

It is often this ability to market huge volumes of oil and gas that forces the governments of producing countries and their NOCs to "open the doors" to their hydrocarbon resources for the supermajors. For instance, in China local CNPC granted Shell access to develop potentially vast reserves of shale gas, tying it with massive investment from Shell to build export-oriented refinery in the east of the country and obliging the supermajor to guarantee the placement of their output in foreign markets. The Qatari NOC Qatar Petroleum involved Chevron and later Shell in joint venture gas-to-liquids (GTL) project, trusting in the ability of the supermajors to market all the output abroad. The total daily capacity of these large-scale joint ventures reached 177,000 barrels of liquid fuels by 2012, which exceeded the most optimistic estimates of the NOC's own fuel export capabilities.¹¹

In this context, it is the "global mentality", distinguishing the group of supermajors from even the most advanced NOCs, that becomes particularly important. As Peter Nolan and Mark Thurber from Stanford University rightly noted: "Connecting supply to demand around the globe requires a truly international focus that is almost inevitably precluded to a greater or lesser degree by home country political constraints faced by NOCs"[Nolan P., Thurber M. 2010, p.20].

In other words, both vertical integration and global scope of the network of oil and gas assets are still very important characteristics of the supermajors' business model, but the forms and directions of their impact have changed. In today's world it is not the mere scale and quantitative parameters of assets allocation by industry segments (Upstream or Downstream) or by country (home or foreign) that really matter, but rather the "quality" of approach to business operations which in case of supermajors could be summarized as viewing the entire international oil and gas industry as a global field of activity relying ever increasingly on the so-called intangible competitive assets that are difficult for its rivals to reproduce.

The prospects of supermajors' involvement in the so-called clean technologies segment is one of the most debatable and controversial topics of today's lively discussion on the radical transformation

¹¹Al Arabia News, 07 June 2011. URL: <http://www.alarabiya.net/articles/2011/06/07/152248.html>.

of the global energy. And without doubt it has direct relation to the nature of potential changes in the business model of «Big Oil». In fact, the increasing number of observers argue that it is exactly «Big Oil» with their «deep pockets» of money, army of scientists employed and enormous worldwide industry experience, that should take the lead in the global transition to the new low-carbon architecture of energy sector. It would be interesting to note that the first wave of these observers, coming mainly from the «green» alarmist camp, has been recently supported by specialist researchers providing widely publicized studies commissioned by big investment banks [Lewis M. 2014, Citygroup, Inc. 2014]. Instead of stressing global warming threat from fossil fuels, these studies focused on «pure economics» arguments of rising «clean energy» technologies' competitiveness and their inevitable victory over conventional rivals.

The actual activities of the supermajors related to clean energy business during last 15 years seem anything but consistent. Since 2000 three of them – Chevron, Shell and BP – have set up ventures in wind, biofuels and geothermal (cf. Table 3). All took significant positions in solar, sometimes more than once. They were absolutely ready to compete successfully or even to dominate.

Table 3. Supermajors' activities in «clean energy» (including R&D)

	Conventional biofuels	Advanced biofuels	Wind	Solar	Tidal	Geothermal	Hydrogen
ExxonMobil	✓	✓					
Chevron	✓	✗		✗		✓	
Shell	✓	✓	✗	✗			✗
BP	✓	✓	✗	✗			✗
✓ Continuing investment				✗ Cancelled/scaled down investment as of 2014			

Source: Morton M. 2015.

But recently, when solar has been really starting to gain momentum in a number of developed market economies, the supermajors decided to quit, surprising even many of their shareholders. One of the most striking example is Chevron which seemed to have extremely successful ventures in solar and geothermal business. In January 2014 after just one year in operation it had established projects with returns of 15 to 20 per cent and had plans to build several geothermal plants in Europe. But then the top management made decision to sell off the whole unit and canceled two giant solar farms in Hawaii.

The explanation of these steps lies in the fact that the supermajors still don't believe that «clean energy» could become a real competitive threat for fossil fuels in the nearest 20-30 years. They were ready to nurture renewables with seed money in the days of the rising oil prices and superprofits but

immediately lost interest when the newly established ventures began to require big investment while the situation in their core industry became very tough. What seems even more important, experimenting with various renewables showed the supermajors how far most of the «clean technologies» (except biofuels which were largely left for further development) are from their core business and what it would take to turn their global «corporate ship» around and head it to the entirely new direction. Robert Redlinger, an executive who has worked with both Chevron and the solar industry, explained this very clearly: "The electrons business is just not core to what the oil majors do. It's not that the oil companies can't get good at it. They're very, very talented and have very good personnel. The question they have to ask themselves is why. If you have a business model that is profitable, and will remain profitable for 20 or 30 years, and that takes all your resources to remain profitable, why change it?" [Ferris D., Gronewold N. 2014]

Certainly, the supermajors are not so naive to believe that somebody could stop technical progress. With their extensive scientific capabilities built over the last decades, they try their best to keep eyes open for the emerging technological challenges and potential disruptive changes. At the same time, having invested billions of dollars in hydrocarbon reserves, the last thing they want is to see them suddenly turned into «stranded» assets. That means they have very little motivation to spur the industry revolution on purely economic reasons. And it is a rare occasion when the supermajors are finding themselves «in the same boat» with major oil-producing countries and their NOCs. As the Fortune magazine analyst, Brian Dumaine, recently put it, "Big Oil doesn't appear eager for an energy revolution either. The industry embraces clean energy in its marketing campaigns but at the same time downplays its potential impact, arguing that solar, wind, and other clean technologies will take many decades to scale, if they ever do. The perspective of oil company CEOs can't help but be influenced by the daunting calculus of the energy economy. An estimated \$27 trillion of fossil fuels remains buried in the ground. And if the world is to meet its climate goals, according to the scientific community, most of that black gold will have to stay there. Exxon Mobil, Chevron, and Shell - not to mention the Saudis and the Russians - seem unlikely to want to leave that kind of money on the table" [Dumaine B. 2015].

The undertaken analysis generally suggests that facing the new difficult challenges in the global oil and gas sector, the supermajors have made a number of significant steps in order to develop a new set of competitive advantages getting much better fit with the rapidly changing conditions. But all these changes have not gone beyond the basic supermajors' business model which demonstrated remarkable vital power. It would be important here to draw a clear line between business model

innovation (BMI) and adaptation. From our perspective, BMI always leads to the creation of the new business model. In contrast to other types of innovation (product and process innovation) BMI can't happen in the form of incremental change. In our opinion, business model innovation is radical by definition, just because it means that at least one of the fundamental characteristics of a business has changed and because it leads to systemic changes in other BM elements which are connected to each other.

This approach to BMI as radical innovation always resulting in the new business model (with the entirely new system of relations with the customers and the new money-making logic), provides the basis of treating the recent changes made by supermajors in their strategy as adaptation. And the general reluctance of the supermajors to be seriously involved in the new «clean energy» activities is just one more proof of this thesis.

Conclusion

It would be possible to argue that, despite the recent serious structural changes in the global oil and gas industry, which were in many ways unfavorable for the supermajors, they proved their ability to deal with the new issues quite effectively. They are quite successful in adapting their business model to the new environment and maintaining very strong positions in the global corporate hierarchy. Certainly, after the transfer of direct control over most of the global hydrocarbon resources to the governments of producing countries and their NOCs, the supermajors are no longer able to directly set the rules in the “global oil game”, as their predecessors did in the times of the International oil cartel. However, one should not underestimate the level of their influence on the main processes in the industry, and even the global economy as a whole. Having focused on the “intangible” competitive assets, the supermajors continue to be industry leaders in terms of their ability to mobilize technological, managerial and marketing potential to solve even the most complex challenges presented by today's global energy industry. They continue to be the indisputable authority for other industry players in the key areas of production organization and the use of advanced technologies, the creators of best practices in building business processes and management systems, and the “trend setters” in corporate culture.

Though «Big Oil» is still reluctant to invest heavily in the new, quickly emerging “clean technology” segments, there is a good reason to believe that the decision has been taken after serious analysis and careful consideration and that the supermajors are closely watching these developments, which could lead to radical transformation of the whole industry in the future.

The recent media campaign, focusing on the trend of supermajors' falling behind the new industry players in terms of growth rates and stock price dynamics, does not in any way indicate that their business model is no longer adequate or fading away. It is just important to remember that the viability of a business model is not determined by growth rates and stock market prices, but rather by the sustainability of the corporate economic mechanism, meaning its ability to generate long-term value for its customers and appropriate financial results for shareholders. The facts actually suggest that, having undergone some adaptation, the supermajors' business model has maintained its vital power and did not lose its ability to secure stable functioning of the entire global hydrocarbon energy supply chain for its customers around the world or to generate good profits for shareholders, at least in the foreseeable future.

As for some cooling of attitudes towards the supermajors on the financial markets, this says more about the emergence of other opportunities for "quick and fat" financial gains in the industry which are more attractive to the largest players in these markets, above all to investment banks. But, as shown by the lessons learnt from the global crisis of 2009-2010, these financial aspirations have nothing to do with maintaining sustainability and viability of the business model, and even more - often run directly counter to fulfilling this task.

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