An Evolutionist Approach to Competitiveness for the Upstream Sector of the Oil industry in a Long Term Perspective

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May 1998

Cahiers du CEG - n° 27

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Abstract:

The purpose of this work is to analyze the concepts of competition and competitiveness in the upstream sector of the international oil industry, and to attempt to identify the possibilities for the future development of this sector as well as the competitive interactions that may exist between the major oil actors, i.e. the international oil companies. For this purpose, we develop a model of "oil competition" and a definition of "oil competitiveness" that take clearly into consideration both the differences between the various oil actors and the dynamic aspects linked to the evolution of the oil industry.

We do so by constructing an evolutionist model of oil competition and competitiveness. This approach emulates a "biological process" in which firms and the economic environment interact with each other in a process similar to "natural selection", with the survival of the fittest. We then introduce the notion of the "dominant form of competition". In addition, this evolutionist model uses some analytical instruments established by Michael Porter, from the University of Harvard, which allow us to define the concept of "generic competitive strategy of enterprises". We can thus interpret the dissimilarities of behavior of various oil actors as well as the temporal changes in their strategies, in an attempt to explain the evolution of their respective role in an oil world that is perpetually changing.

Résumé:

Le but de cet article est d'analyser les concepts de la concurrence et de la compétitivité dans les activités amont de l'industrie pétrolière internationale, de façon à identifier les possibilités de développement futur de ces activités, ainsi que les interactions concurrentielles entre les acteurs majeurs de l'industrie, c'est-à-dire, les entreprises pétrolières. Pour y parvenir, nous développons un modèle de la "concurrence pétrolière" et une définition de la "compétitivité pétrolière" qui prennent en considération d'une façon nette soit les différences entre les différents acteurs pétroliers, soit les aspects dynamiques liés à l'évolution de cette industrie.

Ainsi, nous construisons un modèle théorique évolutionniste de la concurrence et de la compétitivité pétrolière. Cette approche vise à traiter la concurrence comme un "processus biologique" où les firmes et l'environnement économique agissent en réaction réciproque d'une façon similaire à un processus de "sélection naturelle" avec la survivance des plus aptes. Nous introduisons alors la notion de "forme dominante de la concurrence". De plus, ce modèle évolutionniste utilise la grille d'analyse de Michael Porter, de l'Université de Harvard, laquelle nous permet de définir le concept de "stratégie de base" des entreprises. Nous pouvons donc interpréter les différences de comportement des divers acteurs pétroliers et les changements au cours du temps de leurs stratégies, expliquant ainsi l'évolution de leur rôle respectif au sein d'un monde du pétrole qui se modifie continuellement.

Summary

1 - Introduction

The goal of this article is to undertake an analysis of competition and competitiveness in the upstream activities of the international oil industry. We will begin by defining our theoretical framework (**section two**). By taking as a theoretical approach an evolutionist model of industrial analysis, we will establish an ample definition of competition and competitiveness. Within this model, we introduce the notion of "**dominant form of competition**".

Integrated into this evolutionist theoretic instrument, we will also adopt some analytical elements from Michael Porter, from the University of Harvard, to interpret the differences and the changes of behavior of various oil actors within the context of an oil industry that is in a continual process of transformation[1]. The utilization Porter's analytical framework will allow us to develop the concept of "**generic competitive strategy**" of enterprises (**section three**).

In **section four**, we use the proposed methodology to analyze past oil competition in two particular situations: a case of stability, in accordance with the conditions prevailing before the first oil shock of 1973, and a case of great instability, which characterized the oil industry in the 1970s and 1980s. Then, in **section five**, we will focus on the study of the future competitiveness of the international upstream activities in a long term context.

2 - The introduction of an evolutionist paradigm of competition and competitiveness

Our ambition is to take a new look at the problems linked to oil competition and oil competitiveness. To achieve this, the issue is to conceive the competition in the upstream industry as a sequential and dynamic process, which implies the temporal dimension and all the problems of uncertainty associated to time.

As a matter of fact, these instruments are not completely new in economic theory. In a historical perspective, the seminal work that is considered as being the precursor of the evolutionist theory, has been proposed by Clark (1961). Clark's model, a fundamental theoretical reference, was neglected until the beginning of the 1980s, being considered as a minor theoretical development in economic history. Nevertheless, as noted by Arena (1988), in the eighties, this theory has been revived as an important analytical framework for the study of competition and competitiveness.

2.1 The evolutionist notion of competition

In general, an evolutionist model aims to examine the competition and the competitiveness of industries as a "biological process" by which firms and the economic environment interact with each other in a process similar to "natural selection", with the survival

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[1] We are aware that a complete model of competition and competitiveness in upstream activities would have to take into account all the major actors that affect the evolution of the oil activity, i.e.: governments, consumers and the oil companies. Nevertheless, in this work, we will essentially concentrate on the strategic behavior of oil companies in order to provide a better understanding of the role played by these enterprises in the oil competition game. This is justified by the fact that the oil companies constitute the major players in this game and the most important source of competitive advantages.

of the fittest actors and the most appropriate strategies. The market is the place where the selection process takes place. It is there that the most effective strategies predominate over the lower performance ones.

An evolutionist approach to competition shows that, thanks to the selection process, the paradigm of competition, for an industry and at a given period, is characterized by a certain number of **dominant forms of competition**. These forms represent the experience accumulated by the whole industry. At each instant, firms must attempt to identify what these dominant forms are so as to limit the range of strategic options that is really available to them. By doing so, they want to reduce the degree of uncertainty on their strategic choice.

Obviously, at any given time, each enterprise can choose between two possible attitudes: it may adopt strategies in line with the dominant forms or it may adopt innovative strategies.

In the first case, the firm decides to follow the "lowest risk path", basing its own strategy on the accumulated experience of the overall industry. Of course, according to its own characteristics, each firm will have to face specific constraints, which will lead the various actors to choose different strategies within these dominant forms. When all competitors decide to follow the lowest risk path, and in the absence of major exogenous changes, the competition game is likely to tend to a certain stability. The dominant forms of competition become easily identifiable and the evolution of the industry takes the form of marginal and progressive changes.

In the second case, the introduction of a major innovation, or an important exogenous change, can totally modify the conditions of competition. All enterprises are obliged to adapt very rapidly to the new situation and the industry will probably experience rapid and violent changes. Uncertainties and risks will tend to increase, affecting all actors in the market. Several of the former dominant forms of competition can suddenly become obsolete or inadequate. In such a context, the competition game is likely to tend to instability. The market is no longer in a position to recognize and to offer precise indications about the new driving forces of the game. Firms consequently have to employ all the available information to guide their own decisions. The issue is to limit uncertainties and risks. It is also a question of outstripping the other competitors in the adaptation process.

These two cases alternate continually in time. In the absence of major innovations or major exogenous changes, we will probably have temporary stability of the competitive environment. This stability brings the competition game to follow some dominant forms of competition. Nevertheless, when a major change or a major innovation occurs, there may be important transformations in the parameters of competition, producing considerable instability.

2.2 An evolutionist concept of competitiveness

Given the evolutionist vision of competition presented in the preceding section, we can now attempt to establish a new concept of competitiveness that is integrated into this model. Essentially, this concept should reflect the capacity of the actors today to choose and to adopt the best strategies, the best technologies or the best management practices that will allow them to improve or to maintain their competitive position in the economic environment that will prevail tomorrow.

Thus, each competitor has to face three main problems. Initially, it is a question of recognizing the competitive conditions that will prevail in the future. Then, it is necessary to identify the most adequate strategies to deal with these new conditions. Finally, the success or the failure of each firm will also depend on its capacity to adapt itself in time to the expected evolution, because the adaptation and the revision of strategic patterns of behavior are not simple, immediate or peaceful processes within a company.

Clearly, the first difficulty of an evolutionist model of competitiveness concerns the lack of information. It is impossible for enterprises to fully anticipate how their industry will evolve, what strategies will be adopted by the other competitors, which of these strategies will impose the most significant changes on the competitive environment, which innovations will succeed and what changes will finally become decisive for the new paradigm of competition.

This information is never fully available in advance. The degree of uncertainty regarding the future is normally very high, which makes it difficult for any company to define its own strategies. In addition, the existence of innovations can constantly change the nature of competition. Therefore, no actor can truly be sure of the competitive conditions that will really prevail in the future.[2]

However, the most important thing to recognize in an evolutionist approach to competitiveness is the fact that, *a priori*, firms can conduct studies and construct scenarios that may help them to identify some indices for the future evolution of the industry and the future behavior of other competitors. They can analyze the logic of various strategies introduced by the different actors, attempting to observe the consistency between the "proposed goals" and the "instruments used". They can finally seek to identify a number of determining factors that may lead the game to new dominant forms of competition.

Two possible cases must be considered by the theory. In the first case, the paradigm of competition is sufficiently stable. The current dominant forms of competition are easily perceptible for all firms. We may have innovations, but these are gradual and follow foreseeable technological paths. In these conditions, most firms will probably adopt the competitive strategies that conform to this paradigm, because those will probably remain dominant in the future.

We will therefore have a clear reference to evaluate the competitiveness of each competitor. Generally speaking, enterprises that have attitudes in keeping with the dominant forms of competition will probably be more competitive. They reduce their risks by taking into account the overall experience of the industry. Conversely, firms whose attitudes are removed from these dominant forms will take far more risks. The new approach may turn into a great innovation that will change the competitive paradigm, but it may also turn out to be less competitive (Dos Santos, 1997).

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[2] In other words, *a priori*, we can never fully define what the best strategies are to adopt for the future. Only *a posteriori*, when the individual performance of each competitor has been evaluated, are we in a position to ascertain what the best strategies were and which firms were the most effective in the competition game.

In the second case, we have radical innovations and fundamental changes to the paradigm of competition. In such conditions, it will be impossible for firms to fully anticipate completely the competitive forms that will become predominant in the future. A high degree of innovation entails great uncertainties. Even the initial innovations that started the process of rupture cannot be considered as a "strategic panacea", because they may be followed by other even more dramatic innovations which may compensate for the effects of the first movement.

Thus, we can say that when it is possible to find a certain degree of convergence concerning the opinions and the expectations about the future evolution of the paradigm of competition of an industry, we are in a more favorable position to detect dominant forms of competition that may prevail in the future. We will then be able to select the most appropriate strategies that must be implemented today to determine (or to anticipate) the competition game of tomorrow. In this case, our concept of competitiveness has a very clear, a very practical and a very important meaning.[3]

On the contrary, when there is no convergence of opinion regarding the forms of competition that will prevail in the future, we have absolutely no practical criterion by which to evaluate the current competitiveness of enterprises. In such a context, it is not possible to define competitiveness in a simple manner.

It will then be necessary to work with a very blurred notion of competitiveness. The only criterion that we can use concerns flexibility. In a situation of instability, great flexibility becomes absolutely necessary for enterprises to be able to follow the possible evolution of the competition game.[4]

3 - The strategic position and the strategic behavior of enterprises - a theoretical introduction

We now come to the second major theoretical element of this work. The issue is to define an analytic framework for the study of the competitive behavior of firms. We have adopted as our fundamental tool the notion of **generic strategy**, developed by Porter (1980 and 1985). This analytic framework will allow us to identify the most important aspects regarding the positioning and the strategic behavior of oil companies in their upstream activities.

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[3] As we can see in **figure 1**, a competitive company has first to know how to interpret the dominant forms of competition. Then it has to play an active role, attempting to anticipate and even to influence the rules of the competition game. Lastly, a competitive firm must be "flexible". "Flexibility" means: having a margin of manoeuvre and power of dissuasion, and participating actively in stability.

[4] As we show in **figure 2**, more than ever, each company has to be prepared for all sorts of changes. It has to try and bring under control the problem of uncertainties (both by means of apprenticeship and by developing defensive strategies aimed at reducing, sharing or hedging risks). It has to have a continuous and more lively capacity to react. Then it has to adopt an active approach. In effect, the most competitive companies will never accept a passive position in the face of risks and external forces. They have to adopt an active approach, attempting to foresee or even to influence changes in their favor.

3.1 The key concepts of the competitive strategy

The problem of defining the strategic behavior of enterprises is linked to three essential aspects. The first concerns the strategic positioning of each firm in a particular industry at a particular moment. The second consists in understanding how each company redefines its strategic position so as to adapt to changes in the industry. Finally, given the changes in the combination of different behaviors, the third issue is to analyze the possible impacts of these changes on the future evolution of the industry.

In an evolutionist perspective, the sources of competitive advantage that companies can create and explore, as well as the types of competitive strategy that they can adopt, depend on the evolving characteristics of the industry and its economic environment. They depend also on a series of complex, interactive and dynamic relationships, involving all competitors. In addition, in a context of stable competition, these strategies will tend to gravitate around some dominant forms of competition.

After these initial remarks, we can now consider some specific aspects concerning the definition of a competitive strategy. According to Porter (1980 and 1985), we can identify three types of **generic competitive strategies**: the cost leadership; the differentiation; the focus strategy. The latter has two variants: the cost focus strategy and the differentiation focus strategy. These four generic strategies are shown in **figure 3**.

In general, these strategies are designed to engender two types of competitive advantage: a cost advantage or a differentiation[5]. For each industry and for each period, we can develop a systematic strategic analysis, taking into account these four strategic groups. Each group of firms will adopt a different generic behavior. In **figure 4**, we present some predominant elements that characterize these generic strategies.

The generic strategies indicate the existence of several possibilities for achieving a competitive advantage. The focal point of our approach is thus the fact that we have to concentrate our attention on the generic competitive strategies and on the identification of the competitive advantages that companies seek to achieve. The study of competition and competitiveness without a clear notion of the generic strategies of firms is generally not very fruitful.

Obviously, the concept of generic strategy has to be seen in an evolutionist perspective. Strategies that are available at a given moment depend mainly on the industrial structure and on the economic environment of this moment. When the structure of an industry or the economic environment change, the basis on which the strategies are built can also change. In this case, we may expect different results regarding the choice of generic strategies.

Yet, the viability of a generic strategy will also depend on the actions and reactions of the different competitors. For example, the viability of a generic strategy may require the erection of some barriers of entry that can protect a particular segment. Nevertheless,

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[5] A cost advantage means offering buyers an equal advantage at a lower price while a differentiation means providing buyers with a unique advantage that largely compensate for a higher price.

since these barriers are never completely insurmountable, the viability of this segment can change in time.

In short, the possible generic strategies will vary from one industry to another. Then, for each industry, it will also vary throughout time. The industrial structure, the economic environment, the action of governments and political forces, as well as the behavior of each competitor, can make one or several generic strategies viable (or not).

Two cases must always be considered. In a situation of stable competition, there is a dominant positioning of various competitors. Moreover, within each strategic category and between the various strategic groups, there exist dominant forms of competition that are easily identifiable. The various generic strategies can coexist and that tends to improve the industrial structure. Firms that participate in these competition games will normally find a more profitable economic environment.

Conversely, in a situation of unstable competition, competitors continually seek strategic repositioning. We may have dynamic and very complex transformations in the competition paradigm. Within each strategic category, and between the strategic groups, the dominant forms of competition may change. Yet, sometimes, firms choose the same generic strategy, which may result in catastrophic price wars between the different actors and an escalation of instability, with disastrous consequences for the whole industry.

Consequently, it is very difficult to establish a concept of competitive strategy that can be generally applied to all competitors and to all situations. Each enterprise has to find competitive advantages that are consistent with its strategic positioning. These advantages have to be sustainable over a certain period of time. Yet, in time, firms have to adapt their strategy, finding other elements that can favor their competitive position.

3.2 The behavior of companies in strongly internationalized industries

After discussing some initial theoretical elements of the generic behavior of firms, we now have to concentrate our attention on a particular aspect of the setting up of these strategies. The issue is to study the behavior of firms in very internationalized activities. In many industries, and particularly in the upstream sector of the oil industry, the geographical diversification constitutes a major and increasing source of competitive advantage. Companies will find in their international activities the conditions for expansion, for cutting costs, for differentiation or for risk control. These advantages have to be weighed against the costs and risks of becoming more international.

For strongly internationalized sectors, two generic strategies can be pursued: firms may operate on the national (or regional) level, taking advantage of their competence on the local markets, or they may want to risk their chances in the worldwide market. In the two cases, nevertheless, their managers must be aware of the impacts and the possibilities offered by world competition.

By adopting the concepts developed in **figures 3 and 4**, we can interpret the geographical strategy as a choice between a broad-target geographical positioning and a narrow-target geographical positioning. In figure **5**, we present an overview of the different generic strategies that are available to companies that operate in a very internationalized industry. As we can see, geography becomes the most important parameter for the definition of generic strategies.

3.3 The behavior of companies and the interaction between economic and political components of competition

The analysis of the oil competition game demands the comprehension of the possible impacts of political decisions on the conditions of competition and competitiveness. Indeed, considering the strategic dimension of oil, governments have developed a long tradition of strong intervention (explicit or implicit) in the oil business. That has often changed important attributes of the industrial structure and -industrial competition. Thus, political forces have often influenced the competitive strategies of the oil companies.[6]

This section is therefore devoted to the study of some fundamental aspects related to this subject. We seek to establish a more realistic understanding of the true nature of the relationship between policy and government action, and the notions of competition and competitiveness.

According to Vietor (1989) and Oster (1990), if we want to understand the role of policy in the competition game of an industry, it is necessary to observe the fact that firms play a double and interactive game (with their rivals in the market and with their rivals and government authorities in the political arena). For enterprises, policy is a second environment in which they have to compete. This environment is almost as important as

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[6] Recently, the movement towards more economic liberalism has induced a significant reduction in government intervention in oil activities. These changes have subsequently given rise to a new debate that tries to establish the role that may still be reserved for governments in the oil business. This is a very complex question which is still very open, and the current withdrawal of governments is not necessarily definitive.

the market itself. In the political arena, all participants will simultaneously attempt to influence and to anticipate government policies and behavior.

All these questions are very complex and a very precise theoretical model is therefore required to interpret them. Here, we base our analysis on the notion of generic strategy presented in the preceding sections.

In a certain number of economic sectors, and especially in the oil industry, there exists an extremely close relationship between the commercial interest of some enterprises and the national interest of their home country. Some countries see their firms as strategic assets of the nation. They want to develop their own national industry independently of foreign firms. Local consumers appreciate this independence and are prepared to pay a premium price for it (either by accepting higher prices on the products sold on the domestic market, or indirectly through subsidies or other less visible fiscal mechanisms).

Thus, on account of this relationship between policy and the commercial interest of firms, national companies can be created, and may end up by developing an efficient strategic positioning. They focus their activities on their national market at the expense of the rest of the world. The political dimension therefore opens up a new option for differentiation in the industry. On the basis of strong ideological forces, these firms find real possibilities for expansion on the competitive scene. They will develop a focal strategy based on a political or ideological differentiation. This integrated approach allows a new interpretation of the political dimension and its impacts on the evolution of the competition game of industries. Henceforth, the issue is mainly to analyze the way in which political forces can segment the market and make "politically attractive strategies" very sustainable.

4 - The evolutionist analysis of oil competition and oil competitiveness throughout the oil history

The goal of this section is to analyze in more detail the way in which an evolutionist model is supposed to be used for the study of competition and competitiveness in the upstream activities of the oil business. Initially, we will characterize the different oil actors that participate in the international oil game. Then, by analyzing competition in the upstream activities until the first oil shock of 1973, we will consider a situation of great competitive stability. Finally, we will envisage a situation of great instability, analyzing the case of oil competition during the 1970s and the 1980s.

4.1 The main oil actors and their generic competitive strategies

Throughout oil history, there have been three distinct groups of oil actors that have found a place in the competition game: 1) the majors; 2) the national oil companies (NOCs) from oil consuming countries and/or from oil producing countries; 3) the independent companies (originally mostly American companies, but gradually from other countries as well). By associating these firms with the generic competitive strategies that we have presented previously, we will try to establish a new characterization of these three categories of oil companies.

The strategic positioning of the majors:

Their presence in the Middle East represented the most fundamental and significant criterion that distinguished the majors from the other oil companies. The control held by

the majors over the large Middle Eastern oil concessions, since the end of the First World War until the first oil shock of 1973, has allowed these companies to develop a **cost leadership strategy**. This domination has become increasingly manifest as these firms have consolidated their presence and their control over great oil reserves in the region. The issue was to keep full control over these great concessions, to maximize their production and to take full advantage of their huge geological asset. Furthermore, these companies have always favored a very international approach, that is, **broad-target, competitive scope**.

After the wave of nationalizations of the 1970s, the majors were obliged to orient themselves to more technologically sophisticated sub-segments of the upstream industry, while maintaining their international approach. Thus, if we employ our theoretical notions, we can say that, after the first oil shock, the majors were forced to abandon their former strategic positioning, and came to develop a new **broad-target strategy, based on technological differentiation**. Henceforth, the characteristic common to all the majors seems to be essentially their capacity to be present in the most sophisticated upstream activities and their degree of internationalization.

The strategic positioning of independent companies:

The oil industry has probably been the one in which small-and-medium-size firms have found the most fertile opportunities to share the market and to coexist with the larger corporations. This coexistence is fundamentally explained by the fact that, within the oil industry, a certain number of activities are not always undertaken efficiently by the majors. This has opened up interesting possibilities for independent companies to establish themselves in some segments of the industry.

The appearance of independent actors seems also to be strongly linked to the existence of reasonably favorable conditions for entering the industry. Concerning the upstream activities of the oil business, the United States is the country where the barriers of entry have always been the lowest in the world. Consequently, it is not surprising that the United States has by far the greatest number of independent upstream companies. Most of these firms often operate in segments of the business that have been gradually abandoned by the majors. They focus their activities on the most mature regions and on segments that require a lower level of technology.

Recently, the American picture has been partially extended to the rest of the world. This shows that the "geographical positioning" constitutes a fundamental parameter of strategic segmentation in the upstream business. Indeed, most independent companies operate on a national (or even regional) level. This geographical specialization constitutes their preponderant attribute, because these companies are able to operate in already well worked regions with costs that remain competitive. This is why we can normally consider the independent companies as being competitors that concentrate on certain activities. They adopt a **geographic focus strategy, based on costs**. Throughout the oil history, this strategy has appeared to be defensible.

The strategic positioning of national oil companies (NOCs):

As fast as the oil industry has developed and oil has become more important and more strategic for nations, governments have reconsidered their own political strategies vis-à-vis this sector. The political climate of oil activities has changed, with direct impact on the competition game of the industry. The strengthening of the relationship between oil and

policy has induced an increasing sense of oil nationalism. This nationalism then allowed the creation and the expansion of many national oil companies (NOCs).

Apparently the only aspect that is common to all NOCs is the extremely close relationship between their interest as commercial enterprises and the national interest of their country. Most activities of NOCs are developed within their home country, aimed essentially at the promotion of the national interest of this country. Sometimes, these companies are considered as an "emanation of their government" to control the national oil industry. Therefore, what makes NOCs a special case in the oil industry is the particular relationship with their home country and the way in which this country sees its oil company as a strategic national asset.

Due to this characteristic, these companies end up by creating an interesting and significant strategic position. NOCs are basically **competitors that concentrate on their national market**. They build their generic strategy upon the geographical dimension. By developing their national natural resources, they seek to reach a competitive advantage in their target segment. Given the various mechanisms set up by the state to protect them and to help their development, NOCs benefit from **a competitive advantage of a political order**, which ensures the viability of their **differentiation focus strategy**. This strategic positioning has allowed them to develop strong technical and commercial capabilities, and sometimes even to launch themselves into international activities.

4.2 The path to stability and the challenges of stable competition before the first oil shock

Oil history, from the origin of the oil industry in 1859 in the United States until the end of the Second World War, characterizes what can be called the **path to stability** of the oil competition game. This path has been built gradually. Its history is mainly the history of the strategic positioning of the oil companies and the consolidation of some dominant forms of competition. This stability became a reality after the Second World War and globally endured until the first oil shock in 1973.

The different strategies of the various oil actors that have gradually been transformed into dominant forms of competition were essentially the vertical integration of the oil companies, the horizontal integration and the internationalization of the majors, the ideological differentiation of NOCs and the geographical concentration, based on the costs of independent companies.

The horizontal and vertical integration of the majors has taken on an extremely important dimension in the oil industry. It has become the key element of the dominating competitive paradigm of the period. **Horizontal integration**, by binding the most important oil companies to each other, has proven to be an essential instrument in eliminating disastrous competition, allowing these companies to stabilize and to coordinate their competitive environment, and preventing their cost advantage from degenerating into price wars.[7]

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[7] The competition between the majors had to be limited, because it was a question of maintaining a certain level of stabilization so as to protect the structure and the general profitability of the industry, as well as the huge investments committed. In a sense, it was not a question of developing strong competition between the oil companies, but rather of cooperating with each other so as to reduce production, transportation and logistics costs, thereby improving the general competitiveness of oil compared to other sources of energy.

Indeed, the rules that guided the operation of the oil consortiums in the Middle East established that any increase in production capacity within the consortiums had to be negotiated and decided with unanimous approval. Individually, no company could build up excess capacity in the most prolific oil province in the world. Therefore, the majors could not profit fully from their cost advantage in this region.

Vertical integration guaranteed outlets for growing oil production. It allowed firms to minimize their fiscal costs by allocating profits to affiliates that were subject to lower rates of tax. Furthermore, it allowed the majors to smooth short term imbalances between demand and supply. Finally, it turned out to be a very effective strategy by which new independent companies could establish their own place on the oil market without becoming dependent upon the majors.

In spite of their huge oil reserves in Venezuela and in the Middle East, the majors have continued to develop a **strategy of internationalization**. The level of production in the Middle East being defined by very constraining rules within the consortiums, the issue was to find other sources of oil that could be freely manipulated and used. Even if these new sources were not as cheap as those in the Middle East, the fact that they could be managed with more "suppleness" represented an important competitive advantage.

Fundamentally, this set of dominant forms of competition (**figure 6**), has led the oil game to a certain stabilization. Having found their specific strategic positioning within the oil game, all competitors (the majors, NOCs and the independent companies), have benefited from a very stable competitive environment, strong growth and a general reduction of risks. The international upstream business has experienced a long period of strong growth with stability. The dominant strategies have become very evident and durable. The changes in the competition game were only marginal and gradual. In addition, despite the precocious internationalization of the business, the industry was not truly exposed to the challenges and the difficulties that usually characterize a "global business" and a global competition game.

This state of affairs prevailed in the upstream sector of the international oil industry for more than twenty years until the outbreak of the first oil shock in 1973. Nevertheless, by the end of the 1960s, a gradual degradation of the political and economic fundamentals of this competitive paradigm had already begun to dawn.

The rapid expansion into international upstream activities of numerous firms belonging to the independent and NOC groups has entailed an escalation of competition and has released a series of aggressive competitive strategies. The newcomers have begun to compete with the majors on their own ground, especially in the Middle East. Struggles between the majors, the new international actors and governments have subsequently modified the distribution of power within the industry.

The political and economic transformations that occurred at the end of the 1960s and the beginning of the 1970s have resulted in a gradual loss of political and economic stability in the oil competition game. Thus, the process that led to the outbreak of the first oil shock in 1973 had a rather endogenous origin, with gradual development. The origin of the oil instability of the 1970s must therefore be found in the evolution itself of the competition game during the period of stability.

4.3 Oil competition during the period of crisis

The notion of oil crisis from the viewpoint of the upstream sector has had a very singular meaning. The oil shocks in 1973 and 1979 did not simply create problems for the industry. They relaunched the profitability of upstream activities, allowing the oil companies all over the world to improve their profits. They also opened up new and more sophisticated segments in the industry, creating new opportunities for investment that were not available when prices were low. On the other hand, these two shocks triggered a strong wave of political instability.

The counter-shock of 1985-86 entailed a radical modification in the competition paths. The oil prices declined very rapidly, jeopardizing the profitability and even the existence of some oil companies. All the oil actors had to adapt to the new economic context. On the other hand, the political situation of the industry began to become less tense.

In an evolutionist perspective, the 1970s and the 1980s were nevertheless characterized by a capital common element, that is, the instability, the uncertainties and the growing risks imposed on the oil companies. We witnessed the complete upheaval of the old industrial structure. In particular, we saw the disintegration of the oil industry, and consequently the erosion of the major instrument that used to guarantee competitive stability in the years preceding 1973.

Regarding the strategic redeployment of oil companies, the changes were violent. To a large extent, this global and radical repositioning of firms became the most important driving force towards the acceleration of the competition game and the escalation of instability. In **figure 7**, we have summarized some major elements concerning the changes in the behavior and positioning of oil companies.

After the nationalization of the upstream activities in the largest producing countries, the majors lost their cost leadership and became **broad-target differentiators**. Sheltered by the higher crude oil prices, the majors began to put into effect a **technological differentiation strategy**, allowing them to have preferential access to new producing regions (the North Sea, Alaska, and increasingly deep offshore areas), at the limit of existing technological capabilities[8]. Furthermore, the need to find new sources of crude to compensate for the losses in the Middle East brought the majors to strengthen their internationalization policy, making them increasingly broad-target competitors.

The independent companies did not really change their generic strategy. Essentially, they continued to adopt the same **geographic focus strategy, based on costs**. Even after the decline of international oil prices in 1985-86, most independent companies were able to defend their position on the market.

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[8] This strategy has been considered the best answer for the majors to improve their relative position vis-à-vis their competitors, NOCs and independent companies. Based on their technological capability, the majors wanted to strengthen their competitive position by increasing the technological barriers in the most sophisticated upstream activities, making it very difficult for newcomers to enter.

Finally, due to the growing politicization of the oil industry, all the NOCs grew substantially during the oil crisis. In fact, the crisis substantially improved the competitive position of all **political and ideological focus strategies**.

In particular, NOCs from the producing countries became the new cost leaders, with their immense low cost oil reserves. However, since their activities were essentially centered on their national territory, where they had to maintain special political relations with their government, these firms often had to face other costs (for example, high organizational costs), which ended up by partially undermining their geological advantage and cost leadership. Thus, these companies could not enjoy the same cost leadership as the majors did before 1973 (Dos Santos, 1997).[9]

Yet, new NOCs were created or expanded in many smaller producing countries. This new wave of internationalization in the upstream business contributed to the unstable competition. Indeed, small producers have a different oil rationale. Their level of production is closely linked to their domestic political and economic limits. These countries are less concerned with the international problems of the oil industry. In addition, the incorporation of these countries into the world oil supply system put the majors in direct competition with many of these new NOCs. Consequently, not only have we seen the integration of new countries into the world oil supply system, but also the integration of new enterprises, a new oil logic, and new frontiers of competition.

Regarding the dominant forms of competition, the most traditional dominant strategies were weakened or disappeared, while other strategic options were proposed, but with less credibility. Many innovations (endogenous and exogenous) were produced, completely transforming some competition parameters. Furthermore, the firms reacted to events, introducing other changes that were often even more fundamental. It was a question of outstripping the other competitors in adapting to the new challenges of competition.

Considering all the transformations that developed in the upstream industry during the 1970s and the 1980s, it was obviously not just a question of financial and economic changes. Indeed, during this period, the oil competition game was greatly politicized. OPEC was both the major actor and the emblematic figure in this process. More than ever, oil history was marked by political conflicts involving countries and companies.

In such a context of strong instability and rapid transformation, it became very difficult for the oil actors to clearly identify new dominant forms of competition. The short term interests of some competitors, very often linked to political causes, dominated and masked the long term consequences of their decisions. In addition, political changes did not affect all the competitors equally, and therefore had strong impacts on the relative position of the different actors.

5 - Some aspects related to the oil competition of tomorrow

The aim of the preceding section was to demonstrate the way in which an evolutionist model should operate in two diametrically different situations of the oil competition

[9] Nevertheless, the counter shock of 1985-86 can be interpreted as the realization by Saudi Arabia that OPEC could only hope to resume its dominant position if it succeeded in annihilating the differentiation strategies of other competitors by an aggressive cost strategy.

game: a situation of stability and a situation of great instability. In addition, it also attempted to identify some elements in the past that may still be determining factors for the oil competition of today and tomorrow. On the basis of these elements, we can now consider some parameters that may define the competition and the competitiveness of the upstream industry in the future.

First of all, we must recognize that, throughout oil history, the upstream industry has become more competitive, more international, more dynamic, more innovative, more complex and, inherently, more unstable. The rapid evolution in the competitive environment has completely modified the distribution of power, the relative importance and the strategic positioning of the various oil actors. This evolution makes the observation and the revelation of new dominant forms of competition very difficult. Nevertheless, we will try to outline some major forces that are becoming increasingly important in the current oil competition game and that may become dominant in the future.

5.1 Oil competition and some aspects concerning the size of enterprises

We are strongly tempted to say that the size of companies may intensify its strategic role it plays in the oil industry, especially for the following four well-known reasons:

1 - The upstream industry is highly capital-intensive and this characteristic shows no sign of being attenuated.

2 - The technological complexity of the upstream activities will probably continue to intensify. The financial cost to be borne (either directly by the oil companies or indirectly through cooperation agreements) for the development of R&D activities will not be small.

3 - The increase in risks is also remarkable. Technical risks are far greater in the new frontier regions. However, economic risks are always present. They are closely linked to the evolution of the oil price in today's oil world. With the oil price at very moderate levels, the margins of manoeuvre for operators are limited. Lastly, political risks can not be ignored.

4 - Economies of scale and economies of scope become increasingly important in the oil business. The new financial and technical characteristics of the industry require increasingly strong firms which can master the much more complex environment.

Size therefore seems to continue to be an important factor of competitive advantage in the oil industry. As a matter of fact, an evolutionist analysis of this industry compels us to recognize that, in the oil game, some "heavy-weight players" have always played a decisive role.

Nevertheless, today, as far as size is concerned, the "leading group" of oil companies is no longer the same one that prevailed before 1973. In this group, there are still seven (or eight) firms that play the role of "absolute leaders". However the composition of this group is no longer the same:

1 - Saudi Aramco is absolutely preponderant in terms of oil reserves and oil production. It is followed by NIOC (Iran) and Pemex;[10]

2 - In the "upstream gas activities", Gazprom (Russia) is by far the world leader in terms of production and reserves. This company will probably have to be reckoned with on the gas markets;

3 - Shell and Exxon continue to be the *leaders* in downstream (refining-distribution) activities. In addition, they are the most "international" and the most "global" players, operating throughout the oil and gas industry, with a leading position on the technological and financial levels.

4 - Lastly, PDVSA, instead of being dominant in just one activity, has sustained its *leadership* with a position that is relatively strong throughout the entire oil industry. However, unlike Shell and Exxon, PDVSA concentrates its upstream activities in its home country.

It is evident that this new group of seven (or eight) *leaders* has no resemblance to the former "Seven Sisters" of the pre-1973 era. In this new group, the cultural, historical, geopolitical, economic and strategic differences, which distinguish the various members from each other, are particularly striking. Also, it appears very unlikely that this new "leading group" will one day evolve and guarantee the same stability in the oil competition game as the traditional "Seven Sisters" did before the first oil shock.

Regarding the diversity of their generic strategies, we must also recognize the specificity of this new leading group. In the case of the "Seven Sisters", there was great strategic homogeneity. All the seven (or eight) majors adopted the same generic strategy based on cost leadership and a broad-target approach. Then, they adopted strong horizontal and vertical integration to prevent their cost competition from degenerating into price wars. The new leading group displays great strategic heterogeneity. We have, among the *seven leaders*, five NOCs that pursue a political differentiation strategy with a narrow-target approach, and two majors that apply a technological differentiation strategy with a broad-target scope.

Even if important questions remain unanswered concerning the future of some of these enterprises (notably Gazprom, INOC and even Pemex), we believe nevertheless that, for a correct understanding of the new oil competition game, it will be increasingly essential to closely observe the strategic behavior of this new leading group, taking into consideration their great differences, their difficulties, but also their potential and their capacity for evolution.

Furthermore, we have to widen this discussion and attempt to analyze the situation concerning the other major international oil companies and their position vis-à-vis the new leading group. It consists in studying what we will call the "fringe of the oil competition game". In this respect, the most important aspect to consider concerns the evolution of the other five most traditional majors (i.e. Texaco, Mobil, BP, Chevron and Total).

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[10] Obviously, sooner or later, this group will have to be reorganized to allow the return of a fourth major member, i.e., INOC from Irak. Then the new group of seven *leaders* will become a group of eight firms.

Despite their considerable evolution in the last few years and despite their continually strong position on the financial, technological and operational levels (both in oil and gas activities), we are nevertheless forced to recognize that, in relative terms, the competitive position of these enterprises has greatly deteriorated compared to the past. Many other companies have considerably increased their relative weight on the oil scene, reducing the gap that used to separate them from the former five smaller "Sisters". This means, in particular, that the contesting power of enterprises that occupy the current "fringe of the oil competition game" has increased considerably.

5.2 The globalization of the oil competition game

The recent globalization of the international upstream industry has to be seen within a far wider context. It is a generalized struggle where all the economic actors seek new forms of integration in the world economic system. Indeed, international investments will probably play a growing role in the integration process of the world economy. For a number of growing sectors, they will be the major source of capital. Most countries have realized that international investments have become their main source of external capital, notably after the debt crisis of the 1980s in the less developed countries.

In addition, many countries observe that the presence of large enterprises inside their frontiers has proved very beneficial in many ways: access to technology and to export markets, improvement in productivity, the possibility of offering high level jobs to their national citizens. Yet, the integration of the country into the international financial system (considered today as essential for national competitiveness), seems to be facilitated when international investments increase.

This general phenomenon of globalization is particularly well illustrated by the upstream sector of the oil industry. Its capital-intensive character and the geographic diversity of oil and gas reserves fit particularly well into this new environment. More than ever, the upstream industry is becoming an international activity with all that this implies in terms of risk and uncertainty.

No firm is able today to escape from the competitive pressures of a global game. Nobody is in a position to more or less artificially manipulate competitive forces. All oil actors will therefore be obliged to develop a global vision of competition. Each competitor will have to position himself in the new competition game, taking into consideration this international perspective.[11]

Then, as shown by Chabanne and Cueille (1996), after several years of restructuring, most oil companies have re-established a healthy financial position. Companies can now seek to seize the new opportunities of growth that seem to proliferate worldwide. Thus, the financial "sturdiness" of enterprises will also constitute a determining force in the oil globalization process.

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[11] This does not mean that all oil actors will have to become global firms. Although the number of global operators will probably increase in the future, we believe that the oil companies will always find strong arguments by which they will be able to defend their focal strategy or their strategy of geographic differentiation. However, to make these strategies defensible and plausible in the long term, all companies will have to understand the effects that world competition will have on their individual action.

Furthermore, by becoming global, the larger groups become really international. The model of a company, with a national parent company and affiliates abroad, is in the process of becoming blurred. It is being replaced by a model of enterprises with a real global nature, especially with regard to their shareholding, their top executives and their high level personnel. To a large extent, these enterprises are in the process of losing their national identity, acquiring a global dimension. The rapid development of new information technologies, which will probably narrow the gap in real time between the different entities of the same group, will certainly strengthen this evolution, allowing globalization without new centralization.

5.3 Control of costs and organizational strategies

The control of costs and the organizational dimension correspond also to our concept of a dominant form of competition. Since the fall in oil price of 1985-86, the oil companies have embarked on a vast process of adaptation and organizational innovation. This wave of restructuring was particularly strong at the end of the 1980s when problems of high cost and low flexibility suddenly become crucial for the upstream industry. At this time, for a number of enterprises, the issue was nearly a question of survival. The measures have therefore been particularly drastic.

Then, as the oil companies became conscious that oil prices would remain at moderate levels and that instabilities would prevail in the oil competition game, they definitively changed their organizational strategies and the modes of functioning of the whole industry. It was no longer just a question of adapting to a temporary crisis, but rather of preparing for the challenges of a new competitive paradigm.

Companies have therefore sold their less effective assets and the activities not belonging to their area of excellence. They have decided to refocus massively on core businesses and on segments and/or regions in which they had a minimum critical size. Then, corporations have decentralized and have reduced the number of their hierarchical levels, both to improve performance and to gain in flexibility and in reactive capacity. More than ever, rigorous management is considered as a major strategic element (Chabanne and Cueille, 1996).

Thus, restructuring and the rationalization process have turned into dominant aspects of the international upstream industry. Henceforth, a growing number of oil companies are committed to a continual search for new organizational and operational methods. The reviewing of management has become an active policy, aimed both at adaptation to the rapid transformations in the industry and at the growing influence on this evolution.

The will to remain a member of the leading group of the industry, the increased importance attached to the satisfaction of shareholders, the maintenance of a strong financial position, the necessity to be a credible partner in order to have access to projects of high potential, as well as the vital need for superior competence and know-how that can be negotiated in return for access to oil and gas resources, justify the intensive rationalizations and the unceasing search for the best organizational forms practised by several oil companies in recent years.

However, at the same time, the massive reduction in the number of employees has definitively destroyed a tradition of "loyalty vis-à-vis the personnel" that had always characterized these companies. Thus, it is likely that the reconstruction of a certain

culture and a certain "corporate spirit" will constitute one important organizational challenge in the future of oil companies.

In particular, it is not surprising that the search for the best approach to managing a global entity constitutes a great organizational obstacle for the majors. In this respect, we must recognize that the definition of a global organization that is appropriate to the new challenges of the oil competition game is still a great practical and theoretical issue.

Thus, contrary to the situation that prevailed before 1973, when all the majors adopted almost the same dominant organizational form, these enterprises have now to intensify their search to find new determining factors for the future evolution of their management style. Meanwhile, we may expect to see a far larger range of trials and solutions to be tested. Most of these firms will continue to put forward and try out new management techniques such as total quality, re-engineering or various rationalization options.

5.4 The increased importance of the financial dimension

According to our evolutionist analysis, we are forced to observe that the oil industry and financial markets are inextricably linked. In this respect, the oil sector has followed the dominant tendency of modern capitalism. As shown by Pinto Jr. (1994), for very capital-intensive sectors that have very long cycles of investment and production, the mutation in the financial system undoubtedly constitutes an important aspect that must be taken into account.

The decline of the crude oil price has led to a reduction in upstream margins. The increasing complexity of new projects involving a number of actors with different goals and horizons (i.e. oil and gas companies, but also electric utilities and international financing institutions) has strengthened the interaction between the oil industry and the financial system. The capacity to manage large and extremely complex projects, with multidisciplinary teams, appears to be a new dominant form of competition that the oil operators will have to master in order to stay in the race.

Furthermore, it is necessary to recognize that the management of most oil companies tends henceforth to be far more financially oriented. The oil industry has entered a new era in which shareholders and institutional investors have become far more active and demanding, continually wanting the best return on their investments. In addition, they have become more aware and better informed of the risks incurred by their investments.

The oil companies recognize the growing power of shareholders and investors. Having enhanced their own financial position, they have also improved the profitability of their shareholders and investors. Now, these companies are starting to be influenced by further strong pressure from the stock markets, forcing them to adopt strategies oriented to growth.

In addition, the notion of integration can, in this context, be questioned. Firms have to prove to their shareholders and their institutional investors that the integration of their activities in itself brings a certain added value. A growing number of investors seem today to prefer enterprises whose investments are well focused on a limited number of core businesses. They are no longer willing to be dependent on the choice of assets proposed by the firms, whose profitability is normally only average and usually lower than the rate investors believe they can obtain individually. Consequently, investors wonder how the integration of activities can truly improve the competitive position of firms and help them to meet the challenge of growth[12].

Financial aspects will therefore play a more important role in the oil competition game. It is important to note, nevertheless, that the greater importance of financial considerations

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[12] This situation is likely to induce several oil companies to concentrate even more on very specific segments of the industry. It would not be surprising if some large integrated enterprises of today were to substantially reduce their integration, focusing their efforts on an even more limited number of core skills. In fact, regarding integration, the oil industry will probably orient itself toward greater strategic diversification. Some firms will continue to be very integrated (this will perhaps be the case of the largest majors and some NOCs, notably those from countries where integration is still considered a strategic question for the nation). Other companies will give up integration and will tend to specialize in specific market niches in which they have a real competitive advantage compared to other competitors. Lastly, some competitors will probably adopt a partial desintegration process, in other words they will be able to choose a set of separate activities in several business units with a good deal of independence between them.

in the management of oil companies, which may induce these firms to focus too much on the short term, may sometimes have negative consequences for the long term stability of the oil competition game.

5.5 Technological innovation as a source of competitive advantage

An innovation becomes a source of competitive advantage when it can be translated into a determining element for the evolution of the industry. In this sense, after the oil shocks of the 1970s and 1980s, organizational and technological innovations became a growing driving force in the international upstream industry.

First, innovation was fundamental in the strategic repositioning of the majors after the nationalization of their assets in the producing countries. On the basis of a very favorable economic environment, the majors were able to finance the research and development of a series of new technologies. These technologies allowed them to diversify into new segments of the upstream industry that were not available previously. Thus, innovation was also essential for the adaptation process that followed the counter shock of 1985-86.

Innovation has thus proved to be a very determining factor in the definition of a new oil competition game. It has transformed itself into a key element of analysis for the study of the upstream industry of today. This situation will certainly prevail and we can expect a sustained evolution of the technological component in upstream activities. The aptitude to understand the general impact of new techniques on the competition game will increasingly become a determining element for managers of oil companies. It is even likely that new technologies will finally make some current practices of the industry completely obsolete.

Despite these initial observations, several questions related to the future evolution of the relationship between the upstream activity and innovation are still open. For example, very often, short term financial and economic pressures tend to make managers of oil companies overlook this evolutionist perspective of innovation. They question, or even omit completely, the determining role of technology in the current upstream industry. Similarly, the protection of major technological innovations in a new context of alliances is a problem.

In general, technology can influence the international competition game in upstream activities in three major ways:

1 By allowing the enterprises to add value to their assets and to their products. That has a clear advantage for both consumers and shareholders (or the investors that these companies represent).

2 By increasing the aptitude of enterprises to differentiate in other segments of the upstream industry. The massive development of these segments allows the expansion of world oil reserves and the increase of the geographical diversification of the industry. Again, the benefits for consumers and investors are evident.

3 By reducing the costs of activities. Technology has proved to be, with organizational restructuring, the most active and effective solution found by the oil industry to reduce its costs in absolute terms. This cost reduction has allowed the whole industry to provide a growing supply at a declining price to consumers. Yet, technology has allowed the majors and some independent companies to reduce, at least partially, the cost differences that used to divide them from major NOCs in the producing countries of OPEC.

Thus, it is not surprising that all oil actors seek increasingly to improve their technical skills. All oil companies in the world seek to understand the relationship between technological innovation and competition in upstream activities. Then, they attempt to identify the particularities of these relationship within their strategic group. They become more involved in the technological efforts of the whole industry, trying to adapt this technological component to their specific strategy.

5.6 The growing cooperation between oil actors and its dominant role in the oil competition game

Among all the strategies aiming at a certain adjustment to the instability of the oil competition game, the growing cooperation between firms appears to be the most evident. This process is becoming increasingly dominant.

Traditionally, the associations and joint ventures of oil companies were designed to reduce individual risks in specific projects. This objective is still applies, but the attempt to minimize costs, as well as the need to find complementary skill outside the organization, have also become crucial factors in explaining the development of such cooperation among firms, and even the wider nature of these alliances.

Certainly, by entering into a joint venture, firms can share the risks involved in each project. They can increase their capacity of investment and diversification, and limit their financial exposure. They can thus engage themselves in several activities that would be too expensive and too risky for an individual enterprise operating alone.

In this respect, it is not surprising to note an extraordinary increase in the number of joint ventures in Russia and in the other republics of the former Soviet Union where political risks are very high. In the same way, joint ventures have flourished everywhere in frontier zones or in the producing countries of OPEC, to which foreign companies have been allowed to return. It concerns associations among international oil companies and/or between foreign companies and local NOCs. In this last case, it is generally initiated by the host state, but it can also be a way of reducing risks within a particular host country.

In a completely different perspective, the great wave of mergers and takeovers in the 1980s has shown that external growth based on purchasing an entire company was not necessarily a profitable operation. Thus, today, companies seem to be orienting themselves toward far more selective acquisitions and some roundups of assets, focusing on common or complementary activities. In this context, the formation of joint ventures and strategic alliances can constitute a more flexible and more efficient solution than total acquisitions.

Yet, cooperation enables firms to reach a critical size in some segments of the industry, to benefit from economies of scale and to make better use of existing logistic structures. The important objective here is no longer the reduction of risks, but rather a reduction of costs by joint restructuring allowing all partners to eliminate redundant jobs within the joint venture. The global alliance established by BP and Statoil (Norway) is a good illustration. The issue is to develop new technologies and common operational practices to pursue joint exploration activities in China, in Russia, in Vietnam or in West Africa, as well as to share and to optimize the gas infrastructures (new and existing) in the North Sea.

The same logic is found in the new relationships with suppliers. The upstream sector is characterized by the existence of large service companies that have developed high level, specific skills in their own areas. Wishing to limit the number of their suppliers, the oil companies have to a large extent induced the appearance of "integrated service companies" that regroup all the operations that were previously carried out by a great number of different companies. This step has opened up the way to new types of partnership between the oil companies and has put service companies in the forefront.

These strategic alliances associate all the companies involved, from the start of a project,. The goal is to avoid redundant tasks and extra costs. Indeed, all partners have realized that individual efforts (both those by suppliers and those by oil companies), aimed to reduce costs and/or to improve quality, were less efficient than joint action. The difficulty that these two groups of actors had in interfacing was especially responsible for this loss of efficiency. Thus, by integrating the main suppliers into the development of the project, new possibilities of optimization have appeared. The service companies, initially just suppliers, have become real partners, fully concerned with the project, not only with the costs and the periods of their own activities, but also with the result of the project. They participate in sharing risks, but also in sharing profits.

Lastly, it is important to point out that the increasing sophistication and diversification of activities, as well as the growing risks and the financial limitations of individual actors, make it impossible for any firm to be present throughout the entire oil competition game. Having decided to concentrate their efforts on a limited number of core skills, and having reduced their personnel as a result, oil companies no longer have the desire nor the means to master all the sectors of the upstream business. Thus, the concept of cooperation between oil companies in the upstream industry has considerably widened in the last few years.

Associations between oil companies will probably become a dominant form of competition in the upstream business. In addition, strategic alliances between oil companies and suppliers will also represent a new dominant form of competition in the oil industry. In this way, the integrated equipment and service companies will play a growing role in international upstream activities, which will have a significant impact on the future evolution of the sector.

Some potential problems have not been fully evaluated. For instance, companies are concerned about a drift that could, in time, cause them to lose their control of key functions or rapidly eliminate their technological advantage by precociously anticipating the transfer of technologies to other competitors. Nevertheless, this reticence may not affect the current trends in the evolution of the industry. The upstream business will no doubt gain experience of these new forms of cooperation, and come up with the necessary answers.

6 - Conclusion

An evolutionist approach turns out to be a relevant choice for the study of the upstream activities of the oil industry. In fact, evolutionist models seem to be particularly attractive with regard to the analysis of a very capital-intensive sector which is already characterized by high technical risks. In such conditions, it seems plausible for the actors to want to minimize their risks and consequently to be predisposed to seek and to select dominant competitive strategies.

In addition, in a sector where the transformations and disruptions in the competition game are sometimes very rapid and very radical, traditional models of competition and competitiveness normally fail as an analytical instrument. On the other hand, an evolutionist approach allows us to develop a broad understanding of the evolution of this competition game.

An evolutionist approach is important because it can help us to apprehend the evolution of determining aspects of an industry and the inception of new dominant forms of competition. As we have outlined in this article, the future of an industry is normally more than a simple extension of its current trends. Nevertheless, these trends are always the first indices that we consider in exploring the future.

We are aware that the study of competition and competitiveness in the upstream activities of the oil industry is very difficult. Firstly, because it involves analyzing very large and diversified firms, with very different philosophies, objectives and expectations, and about which crucial data are often unavailable to external analysts. Secondly, because the existence of very complex economic and political relationships between the different actors, and between these actors and the economic environment, makes the task even more arduous.

Therefore, the analysis presented above is not exhaustive and a number of important considerations have not been mentioned. Some of our interpretations of oil history my lead to further discussion. Nevertheless, the analytic approach developed in this paper seems to be a very promising theoretical tool.

In this work, we have described a certain number of trends that have a good chance of becoming dominant in the future of the international upstream industry. We have nevertheless seen that the current competition game is far more uncertain than it was during the stable period before the first oil shock. Thus, at the same time, enterprises will have to conform to the new dominant strategies of the industry (which represent the experience accumulated by the industry) and to search for new possibilities of innovation that may open up new opportunities for investment. On the one hand, it involves adopting strategies that may lead to a relative reduction of potential risks. On the other hand, the identification of new ideas and new initiatives will be necessary to meet the major challenges of a competition game that may always change.

Each enterprise will have to determine very clearly what its generic strategy is and what the essential aspects linked to its core business and to its strategic positioning are. In addition, it will have to be imaginative, focusing its efforts not only on following the dominant trends, but also on being ready to establish by itself, at any given time, the new trends that will become dominant in the sector. Henceforth, no oil group can fall into the trap of extreme conservatism. A lack of vitality is likely to have dire consequences on its competitiveness in the long term.

The most competitive actors will certainly have to be very flexible and quick to realize their major forces and weaknesses. They will also have to develop a large range of strategic possibilities and a certain power of dissuasion. In addition, it is necessary to keep a close watch on major changes in the competition game. Those changes can suddenly modify the absolute or the relative parameters of competition. Consequently, each enterprise will have to pay attention to its own competitive position, and to the competitiveness of its most important competitors.

Lastly, this work illustrates clearly that the most competitive enterprises will have a global vision of the transformation process of the competition game and that they will understand that the evolution of competition is "a journey rather than a single event". Thus, the ability to manage changes in the long term and on a large scale will be increasingly significant and critical for the actors that still want to be in the game in the next century.

References:

ARENA, R., "Approches théoriques et économie industrielle", in Arena, R. et al (eds) *Traité d'Économie Industrielle.* Ed. Économica, Paris, 1988.

CHABANNE, S.; CUEILLE, J.P., Les sociétés pétrolières en 1996, In Panorama 97. Held in Paris, January 30th, 1997.

CLARK, J.M. (1961), *Competition as a Dynamic Process.* Brookings Institution, Washington.

DOS SANTOS, E.M. (1997), *Approche évolutionniste de la compétitivité des activités amont de lafFilière pétrolière dans une perspective delLong terme* (Thèse de doctorat en sciences économiques). École Nationale Supérieure du Pétrole et des Moteurs; Université de Bourgogne.

OSTER, S.M., (1990), *Modern Competitive Analysis.* Oxford University Press, pp. 287-306.

PINTO Jr., R., (1994), L'adaptation des structures financières des compagnies nationales des pays producteurs. In L'Avenir des sociétés nationales des pays exportateurs d'hydrocarbures. Held in Paris, 26-27 May.

P.I.W. (Petroleum Intelligence Weekly), PIW's Ranking of the World's Top 50 Oil and Gas Companies. *P.I.W. - Special Supplement Issue,* 1988 à 1995

PORTER, M.E. (1980), *Competitive Strategy: Techniques for Analyzing Industries and Competitiors.* The Free Press, New York.

PORTER, M.E. (1985), *Competitive Advantage: creating and sustaining superior performance.* The Free Press, New York.

VIETOR, R. (1989), *Strategic Management in the Regulatory Environment.* Prentice-Hall, Inc., pp. 23-39.

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