

Oil companies exploration strategies in the 21st Century

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Good morning. It is a pleasure to be here this morning and to be speaking on exploration strategies, particularly at a critical stage in the history of the oil industry.

I have drawn an outline of my comments today on this diagram (Fig. 1) to highlight, first of all, what strategy is all about. We will review the prevailing climate in the industry and what trends will affect the environment. We need to consider appropriate goals and objectives, what the competition is likely to be and what they are doing, and how we can maximize our strengths and minimize our weaknesses.

The current edition of the Harvard Business Review had an excellent article entitled "What Is Strategy?" by Michael Porter, which came at a very convenient time for myself as it gave many of my thoughts a credible academic framework. For the past 20 years, managers have been learning to play by a new set of rules that I have always felt have not been particularly appropriate. They have had to perform organization gymnastics in being flexible

to respond to rapidly changing competitive and market forces, benchmark continuously to achieve best practices, outsource aggressively to gain efficiencies, and nurture core competencies in the race to stay ahead of rivals. Of course this was being achieved at the same time as the industry was undergoing one of the greatest industrial meltdowns in modern commercial history with over half a million jobs lost in the past 15 years. Although the improvements in operational effectiveness have often been dramatic, many companies have been frustrated by their inability to translate those gains into sustainable profitability, and management tools have gradually taken the place of strategic positioning which was rejected at the heart of strategy as being too static for today's dynamic markets and changing technologies. But while both operational effectiveness and strategic positioning are essential to superior performance, the essence of competitive strategy is choosing to perform activities differently or to perform different activities than rivals. And a sustainable strategic position

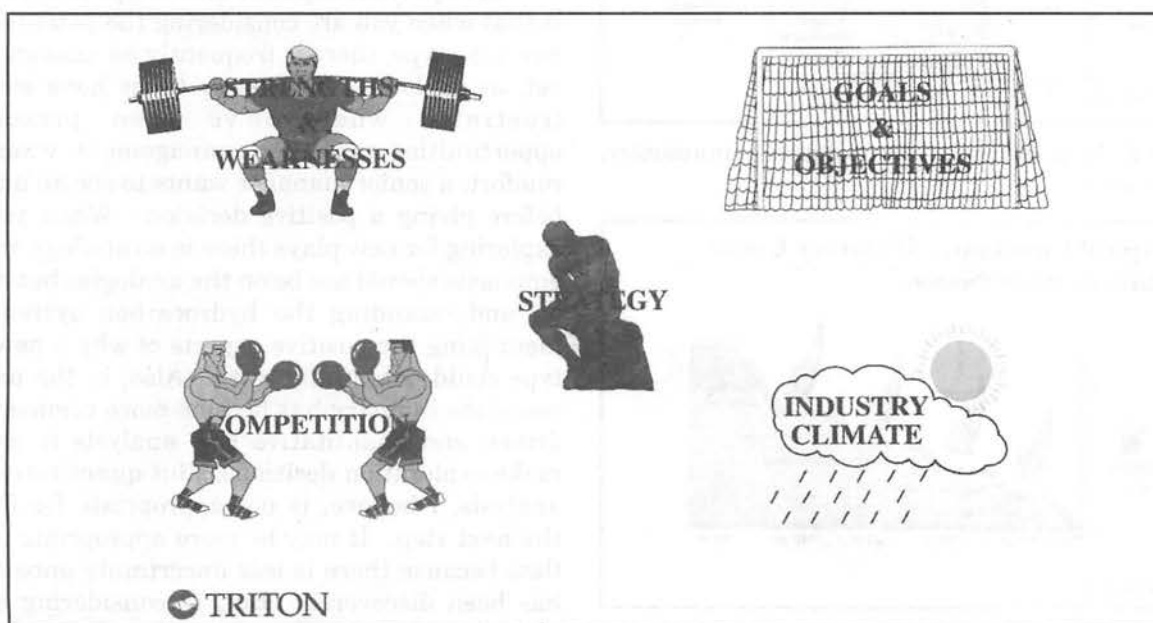


Figure 1. Strategy.

also requires tradeoffs.

Let us look at the different issues that need to be considered in defining what strategic position to take.

In considering the return on exploration over the long term, it is generally the large fields that are found first and they generate the greatest value as revenue far exceeds costs (Fig. 2). But exploring for the large fields is where the greatest risk occurs in the exploration process. Once all the large fields have been found, medium sized and then gradually smaller and smaller fields are found. As exploration of that same play type matures, incremental revenue also decreases with field size and, if costs are not controlled, then value or wealth is destroyed. This is why cost control has been so important to the industry in recent years.

Already you can appreciate that different companies will be able to operate very effectively only at certain stages of the cycle; and few companies operate effectively across the spectrum. High risk/high reward exploration activities initiate the cycle while expertise in marginal field developments characterize the final stages.

This now is the first choice that a company has in deciding on what strategic position they are

going to take within the exploration cycle. A commitment to specific activities then implies tradeoffs. For instance, if you are undertaking high reward exploration at the front end of the cycle with all your procedures, organization, people skills and risk analysis geared to that type of activity, then you should not be contemplating marginal field development where low costs are key to the success of that company.

The next diagram (Fig. 3) demonstrates that there are, in fact, many cycles of wealth creation.

Cumulative discoveries in any particular hydrocarbon province or country do not just increase in a straight line relationship. The discovery curve evolves in steps and flats where each step and flat can be attributed to a different play type and the next step occurs through the creative ideas of explorers or through the application of new technology. Also, a step may be the result of fully realizing the potential of a play type that may have been found some ten or twenty years previously but for various reasons, particularly new technology, that full potential was not appreciated. Over a substantial period of exploration activity in a hydrocarbon province, new play types are continually added within the hydrocarbon system.

In looking back at Figure 2, it is obvious that the greatest risk occurs in realizing the next step in this cumulative discovery curve and that risk averse companies will never find the large fields except, of course, by serendipity. It is important, therefore, to understand the hydrocarbon system, which plays work and why, and which plays do not work and why, to identify where the next potential play type may lie.

An important exploration concept to appreciate is that when you are considering the potential of a new play type, there is frequently no analogy. And yet, as explorers, how many times have we been frustrated when we've been presenting opportunities to senior management when, for comfort, a senior manager wants to see an analogy before giving a positive decision. When you are exploring for new plays there is no analogy and the emphasis should not be on the analogies but rather on understanding the hydrocarbon system and identifying the positive aspects of why a new play type could potentially work. Also, in the past 25 years the industry has become more commercially driven and quantitative risk analysis is used to make exploration decisions. But quantitative risk analysis, I believe, is not appropriate for finding the next step. It may be more appropriate on the flats because there is less uncertainty once a play has been discovered. But, in considering a new play, there is greater uncertainty and a qualitative approach is much more appropriate. I'll discuss

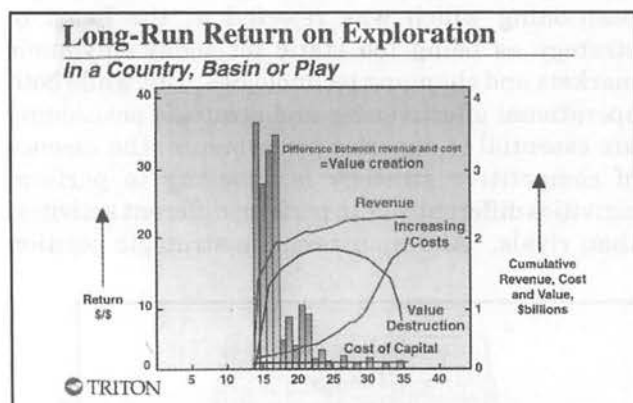


Figure 2. Long-run return on exploration — in a country, basin or play.

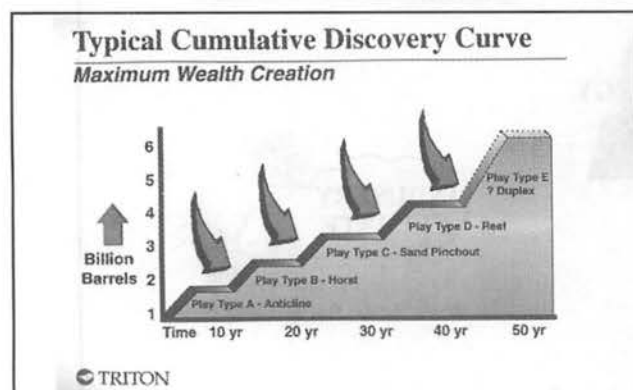


Figure 3. Typical cumulative discovery curve — maximum wealth creation.

this in more detail later.

This next diagram (Fig. 4) shows the world annual discovery rate averaged over 5 year periods during the early twentieth century and shows a peak in the 1960's when the industry was extremely successful at finding huge new reserves.

But of course over the past 25 years or so that discovery rate has declined dramatically and is used by many people to argue that the age of exploration is over. It is inevitable that discoveries will decline due to: the finite nature of hydrocarbon resources; geography, as there have been many areas where the industry was not allowed to explore; the rise of the national oil companies and more onerous fiscal regimes; and also due to a reliance on quantitative risk analysis. Decisions based on most likely outcomes, rather than looking at upside potential, is also a significant factor why major discoveries are not being found.

Within this trend of decreasing discovery rate, the decreasing value of exploration is exacerbated since even the giants that are discovered do not have an impact on the big companies like they used to do in the past. The Cusiana discovery in Colombia, that most of you are aware of and which I spoke about at this conference last year, is a

classic example of that. BP, TOTAL and ourselves, as well as the State oil company, Ecopetrol, are involved. BP is the operator but they have only has 16% interest and that has very little impact on them, whereas we have 10% interest and that has a huge impact on a company our size.

The industry during this period also took an excursion into frontiers. That, of course, was geographic frontiers and the industry has been spectacularly unsuccessful in that venture in that very few, if any, new hydrocarbon provinces have actually been discovered or have added any significant reserves to this overall picture. But, I believe, explorers need to concentrate on the frontiers of thinking in proven hydrocarbon rich basins in defining the next step of the cumulative discovery curve. That of course requires creative, imaginative exploration associated with, as I have mentioned, qualitative risk assessment.

The next diagram (Fig. 5) shows the world production history over the past 60 years and forecasts for different areas in the world. You can see that there is a dramatic drop-off in production because reserve replacement has not taken place in line with the rate of production and this provides a fairly alarming future.

If production forecasts are based on field decline curves rather than reserve to production ratios, then the decline is exacerbated and, in fact, the world will run out of oil a lot sooner than even this curve predicts. In the 1970's, OPEC supplied 60% of the world's production and then it changed in the 1970's and 1980's when, fortunately, other areas of the world were able to compensate for lower OPEC production. But as resources in non-OPEC areas are used up more rapidly, in only another ten years or so, the world will be relying purely on OPEC oil.

At the same time it is interesting to contemplate that 94% of remaining reserves are in the hands of national oil companies but 75% of the market is owned by majors. Majors have seen a drop of some 11% of their reserve base in only the last 2 years. So it is fairly obvious to anticipate that the majors, who require access to the resource, need to have strategic alliances with the national oil companies. There are a few opportunities to access oil reserves that have an impact on majors. It is not surprising therefore that in the recent licence round in Venezuela hundreds of millions of dollars were paid just as signature bonuses to capture that resource. Large companies should be doing exactly that. One can question at the end of the day whether much value would be generated from the very onerous terms and conditions that are attributed to these licences but, from a majors perspective, that is not the driving force because they need access to reserves to prevent the steady decline of their

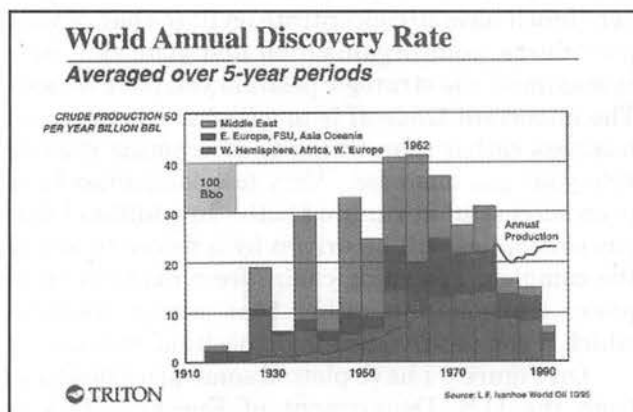


Figure 4. World annual discovery rate — averaged over 5-year periods.

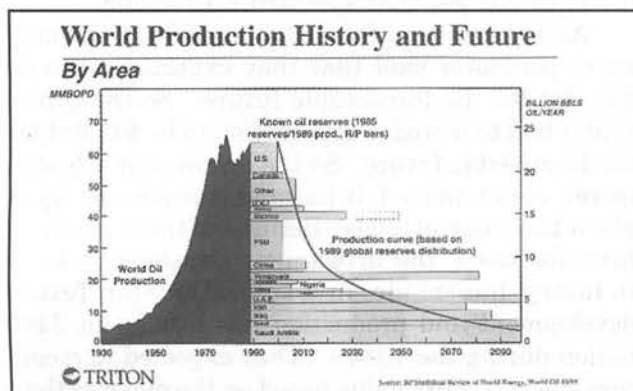


Figure 5. World production history and future — by area.

production profiles. Mobil, for example, needs to find 300 million barrels a year just to avoid shrinking, so it is important that they capture the resource. But in contemplating the magnitude of yet-to-find resources, 250 companies are seeking interests in about 6% of remaining oil reserve in the world and that is about 140 to 200 billion barrels. So many companies will and should exit the exploration business and focus on capturing the resource in other ways.

The situation facing the world is alarming since production is expected to decline from known reserves while economists predict primary energy

demand will increase significantly to fuel the growing economies.

On the statistics presented on Figure 6, oil demand is set to increase some 50% in the next 15 years and particularly to double in the Asia-Pacific region.

Gas demand, Figure 7, is also expected to more than double, maybe even more, if other resources cannot keep pace with fueling the energy demand of growing economies.

We know it will be more difficult for oil to keep pace, as it will probably be for coal due to environmental constraints. So it is hardly surprising that gas is a principle feature of most companies portfolios now, not just in exploration and production, but in trying to get involved in the whole value chain. A word of caution here is that I believe there is a great danger in some oil companies diversifying into the gas business because it is a completely different business to oil. Some 20 years ago many companies diversified into minerals, solar, coal — they were not very good at understanding those businesses and indeed most oil companies have now withdrawn from their diversification exploits at a considerable cost and further decrease in value of their business. To my mind, if you are involved in the gas value chain you very much have to concentrate on it; to change your procedures, your organization and your skill base to maximise the strategic position you have chosen. The important tradeoff is to withdraw from the oil business rather than trying to incorporate it alongside your gas business. Very few companies have been successful at running both. In addition I fear gas companies will be driven by a desire to access the complete gas value chain, from exploration to power transmission rather than accept tradeoffs which a competitive strategic position demands.

On Figure 8 I have plotted some price forecasts from the U.S. Department of Energy. This is important to look at because exploration spending is based on price forecasts and we know that the industry has got that spectacularly wrong!

At a recent conference I attended, virtually every presenter said that they expected oil to be \$17 flat for the foreseeable future. So the cynics said it had to increase expected oil to be \$17 flat for the foreseeable future. So the cynics said it had to increase and, indeed, it has and it is already up to about \$25 a barrel today. Because of these incorrect price forecasts, the investment decisions that the industry has made in exploration for future development and production has lost about \$100 billion during the 1980's. They expected to create considerably more value based on the oil price than they have been achieving. It is not surprising, therefore, that this lead to the cost reduction,

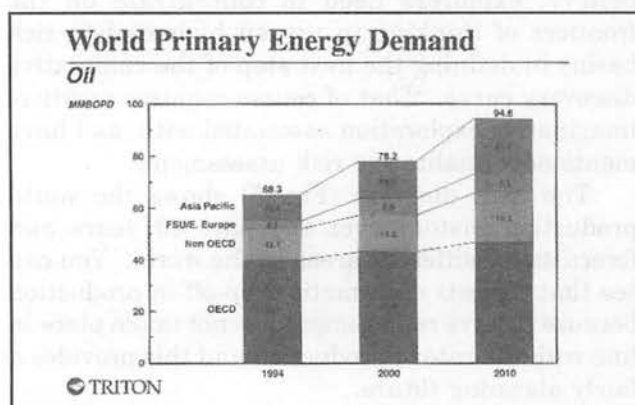


Figure 6. World primary energy demand — oil.

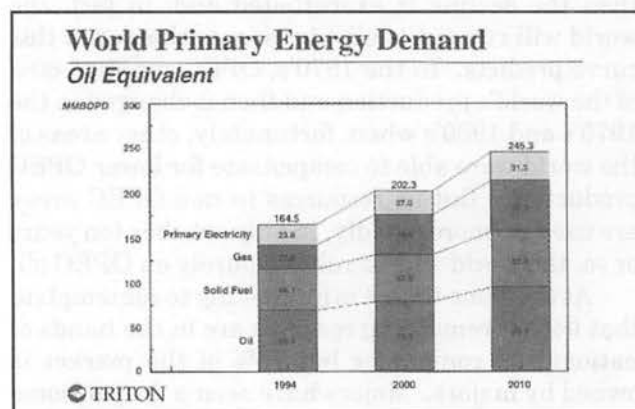


Figure 7. World primary energy demand — oil equivalent.

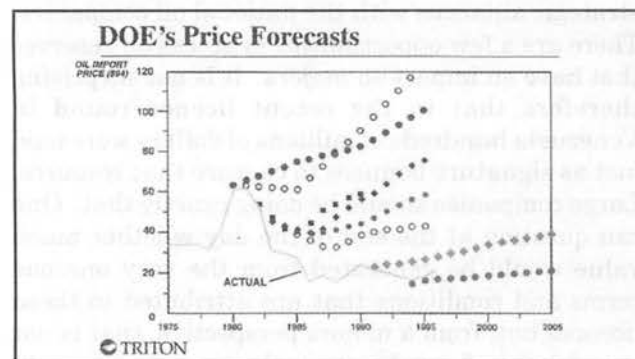


Figure 8. DOE's price forecasts.

downsizing, rationalizing, focusing, and outsourcing that the industry has gone through recently. What we also need to be conscious of though is to beware of the successful dinosaurs that process has created because yesterday's solutions and people might not be appropriate for tomorrow's challenges and problems.

Now let us take a look at the next aspect that I want to mention and that is the competition. Figure 9 looks at the percentage of world oil business outside of the former Soviet Union and China and from studies undertaken by Van Rensburg of the University of Texas, Austin.

From a competitive point of view, the main effect over recent decades, as I have mentioned, is that the majors have lost a very significant proportion of their reserve base and, consequently, the influence that they previously exerted. This has been offset by the rise of the national oil companies, both producing and consuming countries. I have already alluded to the necessity for alliances and that is what meganationals refers to. Meganationals will be the alliances between majors or multinationals and the State oil companies because they will need to balance supply and the market demand situation. With the decline in the U.S. domestic industry, the number of large to mid-size independents has decreased rapidly. That decline is likely to continue although a recent strong trend for U.S. independents is to go international. That trend is likely to continue.

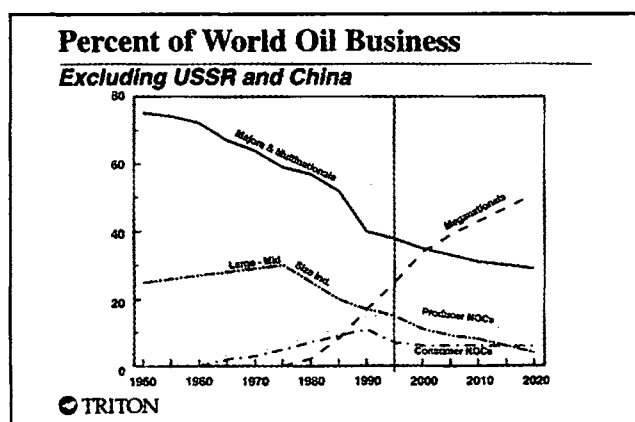


Figure 9. Percent of world oil business — excluding USSR and China.

- Profit
- Survival
- Growth
- Risk reduction

Figure 10. Objectives of players.

Independents will develop niches or strategic positions which, of course, in the overall world oil business will be relative unimportant on a large scale but can be extremely profitable on a small scale.

Most players in the industry share a common objective — that of value creation, but their exploration strategic positions will be very different. Let us look at just four items here — profit, survival, growth and risk reduction (Fig. 10).

From a profit standpoint, the concept is the same but there are different driving mechanisms. Many companies will be driven by dividends, some will be driven by asset value, particularly the smaller companies who have volatility associated with their asset value. Of course some State oil companies are not driven by value or profit. For them it is not even an issue.

From a survival perspective, the declining reserve base is very dramatic and is having a big impact on many companies, so capturing the resource is extremely important. Just to revisit the Mobil situation, here is a classic case where Mobil has realized that they cannot replenish their reserves purely by exploration and so they have been on a spending spree this last year purchasing Ampolex in Australia; offering a \$100 million signature bonus to acquire an interest in the La Ceiba licence in Venezuela, purchasing a share of the Camisea gas condensate discovery in Peru; purchasing their way into the Natuna Gas Field in Indonesia and paying \$1.1 billion for a 25% interest in the Tengiz Field in Kazakhstan. Investment decisions are frequently based on rates of return but when you are trying to survive, the rate of return hurdles can be lowered and is less important than capturing the resource.

In looking at growth, I think it is virtually impossible for most of the large companies to grow through conventional exploration. It is only possible for small companies to grow in any sort of significant fashion. The gas value chain will offer some opportunities for growth but only, to my mind, at the expense of that company's declining position in the oil sector.

And finally, most companies are commercially driven, so spreading risk exposure becomes fundamental to their modus operandi. It provides more opportunities but it has less impact. Alliances will become the norm as will reserve acquisitions by purchasing because that removes the exploration risk. So, companies will be withdrawing from traditional exploration and, as we have seen in the past 5 to 10 years, concentrating very much on their core areas. They will be undertaking some exploration in their core areas but are relatively low risk type exploration opportunities. In fact, at

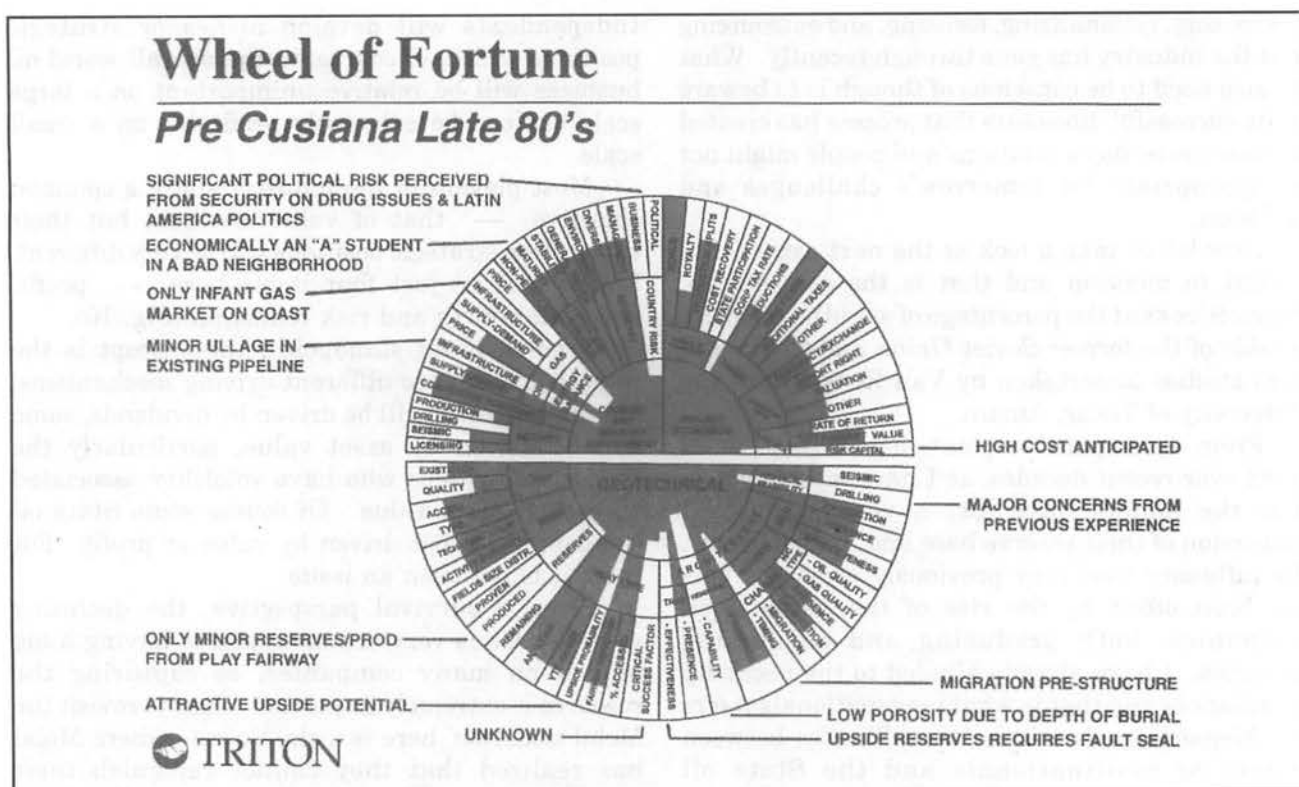


Figure 11. Wheel of Fortune.

a recent conference my equivalent in Amoco was not even considering exploration new ventures but was talking about production new ventures as their main strategy. A notable exception to this situation is for those companies like ourselves that are commercially aware but exploration driven who can manage the appropriate exploration risk and, as I have mentioned, can make significant new play type discoveries that will have a large local impact as well as creating value for their shareholders.

Well, how do we go about that qualitative risk analysis? We, as explorers, have a responsibility to convey uncertainties and risks to management to help the decision making process and of course every opportunity has some risk. But in Triton, we do not use risk analysis as an excuse for not doing something but as an opportunity to focus our efforts on critical risks to minimize the impact. We plot all of the parameters that we feel are appropriate in looking at an opportunity onto a wheel (Fig. 11).

On the southern hemisphere of the wheel we plot all of the geotechnical aspects. On the northwest quadrant we look at the country and industry environment and on the northeast quadrant we plot all the project economics. Every spoke of the wheel is a different parameter and we literally very subjectively and qualitatively plot either to the outside of the spoke of the wheel if something is very good or positive or we plot toward

the inner circle if that particular parameter is very negative or detrimental to the opportunity. And consequently any parameter that plots within the inner circle is an area of critical risk. We question if there is any work that can be done to reduce the uncertainty or, if we understand the uncertainty, whether management is prepared to accept that risk. But what we concentrate on in looking at this 'wheel of fortune' is in helping our management consider the upside potential in relation to perceived risks that the opportunity offers. Upside potential is plotted between the 6 and 7 o'clock portion of this wheel. Also we look at whether the opportunity provides the appropriate fit within our portfolio in terms of strategic positioning and the timing of the value realization because we, as an independent, have a very different time frame for value creation than do most of the majors. Risk can never be adequately described as just a single number but this qualitative and illustrative risk analysis approach that we use is very powerful in conveying the relative significance of different parameters.

Critical to competitive strategic positioning is leveraging what you are good at. This is so important! There are many examples of very successful companies in every business sector where success has been attributable to maximizing what they are very good at. But unfortunately, in many circumstances in the oil industry, too much emphasis in the past has been on minimizing

- **Darwin — adapt to change**
- **Leverage for positioning**
 - Purpose
 - Portfolio
 - Process
- **People**

Figure 12. Strengths.

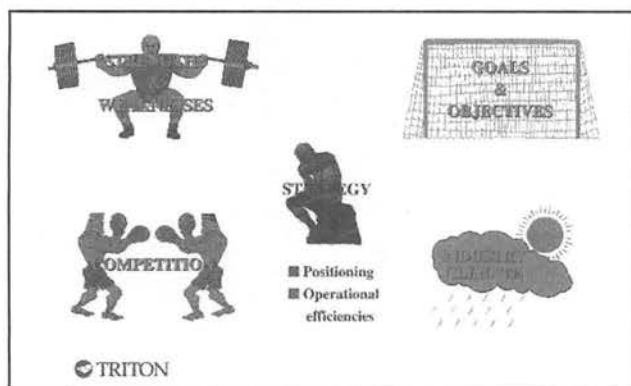


Figure 13. Positioning and operational efficiencies.

weaknesses. How many times have we sat through annual performance appraisals when your supervisor has spent most of the time discussing your weaknesses and what to do about those rather than discussing the impact strengths (Fig. 12) and the value that you bring to the organization? Darwin, or course, in his classical study of the origin of species, recognized that it was not the strongest or the largest or, indeed, the most intelligent of the species that survived but it was those that adapted to change. What species were doing was defining their strategic position within the evolutionary chain.

So how within our business can we leverage for position? First of all, our purpose has to be very clear. It requires tradeoffs for maximum effect. In Triton, we have defined our purpose as being very clearly an international exploration company which

applies frontiers of thinking in proven hydrocarbon provinces to realize the next step in the cumulative discovery curve.

From a portfolio aspect, if you are an exploration company you need to be drilling wells and we have aimed at trying to drill approximately 10 significant exploration wells per year. That is an impressive level of activity for a company of our size!

Consequently, all the processes we have in place are geared solely to achieving the purpose. We have a very flat organization for creativity which allows decisions to be made very quickly. Two main tools are used in the technical aspects of exploration. One is the dynamic chronostratigraphic diagram for understanding the hydrocarbon system and identifying where the next play potential might be. And second, as I have mentioned, the 'wheel of fortune' which conveys a qualitative opportunity risk assessment.

And finally the most important aspect — the people. You have to have the appropriate skills for the purpose and process of the organization. It is not just technical skills that are important. You need people with the right attitude, motivation, respect, courage, patience and perseverance to achieve the purpose that you have set yourselves. It also requires risk takers for growth — those who are prepared to overcome the fear of failure and are open to new ideas. It requires an organization of individual leaders, those who challenge the status quo. Our people are also encouraged to capitalize on uncertainty to create opportunity which is not surprising given the type of company we are. And then, of course, most importantly we reward them appropriately for the contribution they make in creating value.

In summary, strategy has become a buzz word but, to my mind, it is all about positioning within the industry climate (Fig. 13) — deciding what your objectives are, what the competition is doing and while accepting tradeoffs play to your strengths. And remember, the essence of a competitive strategy is choosing to perform activities differently or to perform different activities than rivals.

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