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Creating the Virtual Oil Company

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Introduction

In the past quarter of a decade more than one third of the entire energy industry workforce has been eliminated. In the last 4 years the US energy industry lost 13% of its workforce and last year it wrote off US$5.7 billion worth of assets[1]. On the London Stock Exchange, the Oil Exploration and Production sector had the unenviable reputation as one of the worst performing FTSE sectors prior to its reclassification as a sub-sector in April 1999. What has happened to the oil industry, what is happening to the oil industry and more importantly, what **will** happen to the oil industry?

Fundamentally the industry hasn't changed. The basic geologic and engineering principles that support the art of oil exploration and discovery remain just as valid today as they did a century ago. Exploration is still a high-risk business and drilling is still the only way to discover oil and gas reserves. The adoption of leading edge computer technology has enabled the industry to collect, process and interpret more data in less time but arguably, has failed to significantly increase success rates and reduced risk. Lead times in investment and development cycles are still some of the longest in any industry sector and with the recent mega-merger activity, oil companies still remain as some of the largest corporations in the world.

The changes affecting the energy industry have for the most part, taken place outside the sector. Global and regional economic changes and in particular, the 'e' enabling of business via the Internet, have both had dramatic effects on how the industry operates and competes in the new global economy. An economy that is not only borderless but also instantaneous through the real time delivery of online information and services. The Internet has made time irrelevant. Or has it? How does an industry that traditionally has some of the longest financial and operational cycle times of any sector, survive in the new 'online' economy? The traditional, knee-jerk reaction is to shed costs. Staff redundancies, asset divestments and so-called global business restructuring, which in most cases, simply refers to the destruction of shareholder value. Unfortunately, restructuring around a cost savings model will not guarantee survival in the new online economy. It may keep the investment community content in the short term but this traditional reaction will not provide a stable platform for survival and more importantly, future growth. The new global economy requires a fundamental change in the energy industry.

The concept of a virtual oil company is certainly not new and has been touted as an alternative to the traditional corporate structure ever since the 'outsourcing' business model became popular in the early 1990's. The definition of a virtual oil company however has undoubtedly changed dramatically since the introduction of the Internet as a business-enabling tool.

The pre-Internet virtual oil company had two redeeming features: a redefined core business and an assortment of strategic business alliances. The redefined core business focused on outsourcing all non-core activities such as accounting, human resources and in some cases, information technology. Replacing the permanent staff in these functions was a 'virtual' team created by the formulation of strategic alliances with accounting firms, consultancy groups and traditional service providers. By

contrast, the virtual oil company operating in today's online global economy is not only defined by its core business activities and strategic alliance partners, but more importantly, its ability to create knowledge and make decisions in real time. Today's virtual oil company operates on an entirely different time scale and is characterised by the following attributes:

- Management flexibility to accommodate and accept change
- An understanding of the value in creating and sharing corporate knowledge
- Ability to redefine core business activities
- Development of an 'online' global culture

Although these four attributes make no direct reference to the actual skills required to find, develop and produce oil reserves they do highlight the fact that the core business activity of the virtual oil company is dramatically different from that of the traditional oil company. The virtual oil company is about real time asset management and it is this ability to manage information, knowledge, strategic alliances and oil assets in a way that will enable the virtual oil company to successfully adapt to the changes brought on by the new e-economy.

Changes Affecting the Industry

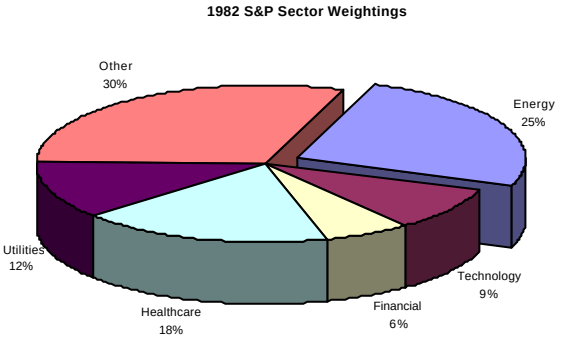
The economics for accommodating change within the oil industry have historically been fairly straightforward and for the most part, predictable. Oil price drops have resulted in staff reductions and decreases in expenditures on exploration and development projects. Oil price increases have conversely prompted additional expenditures and corporate expansion and even though oil price fluctuations are cyclic, with some cycles being as short as one year, the majority of companies continue to operate on reactive rather than proactive investment strategies. What the industry has failed to reconcile is the need to align the long lead times in investment and development cycles with the shorter fluctuations in world oil prices and changing global economies.

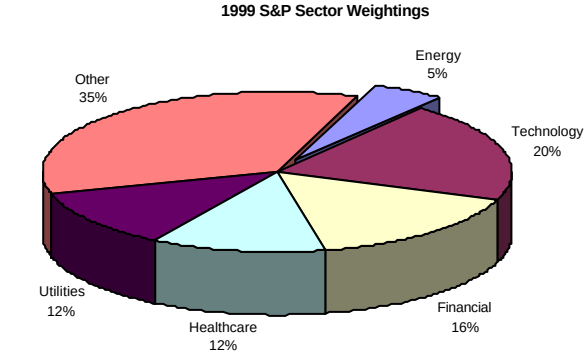
Failure to align the traditional energy industry cycles with global economic changes can lead to disastrous results as witnessed by the 1973 and 1979-80 oil crises which in both instances, triggered global recessions. Although one could argue that both crises could be attributed to events in the Middle East, namely the Arab-Israeli War in 1973 and the fall of the Shah of Iran in 1979, two other factors played important roles in ensuring the onset of a global recession in both cases - the growth in world consumption and more importantly, the inability of the oil industry to increase non-OPEC oil production. Some argued that the inability of the industry to increase production was due primarily to a lack of investment by the oil companies themselves. And now with the Far East economic crisis of 1997-98 triggering a fall in oil prices to a low of $10 per barrel and the subsequent, albeit expected drop in oil industry investment, one could argue that the economic conditions are ripe for another global recession. However, in all likelihood this probably will not happen and for reasons that have more to do with changing global economies than mis-aligned oil company investment strategies.

In the past 30 years, with oil prices ranging from $10 per barrel to over $35 per barrel, the world economies have had to make significant adjustments to their dependence on oil. Most economists would agree that changes to the oil price have much less effect on the global economy today than they did three decades ago. This point is certainly reflected in the US where crude oil consumption accounted for 4% of the GDP in 1974, 2.4% in 1990 and only 1.4% in 1999[2]. Unfortunately for the oil industry, adjusting the global economy to operate on less oil has forced the world to become more efficient and encouraged the development of alternate energy sources. Ironically the effect of these changes now means that the price of oil, to a large extent, is dictated by the global economy and not the other way around, as was traditionally the case. The oil companies are now faced with operating in an environment where they have less influence, less importance and more uncertainty.

The risks associated with exploring for and developing oil and gas reserves has always been a core part of the oil company culture and dealing with uncertainty in a technical sense, has never been a problem for the more successful companies. One could argue that such challenges have made the industry one of the most technically advanced in the world in terms of the application and transfer of technology. But as the GDP figures above clearly illustrate, the world has not only managed to successfully reduce its dependence on oil but, at the same time, become less interested in the industry as a whole.

The lack of interest in the industry that is intimated in the GDP figures is also reflected in the financial investment markets as can be seen in the charts below.





Source: S&P/ J.S. Herold 1999 Pacesetters Conference

In 1982 the energy industry accounted for 25% of the S&P Sector Weighting and in 17 years went from the largest single sector to one of the smallest. Even more astonishing is the fact that in both years, the comparative price of oil was approximately $30 per barrel.

The financial consequence of the change in investor attitudes towards the oil sector is one of the biggest factors affecting the industry today. According to Victor A. Burk, Arthur Anderson's managing partner for Energy services, E&P companies must find ways to create and realise value in all their assets as many companies struggle to convince investors they can create value during a time of strong product prices and cash flow.[3] Certainly E&P companies are accustomed to operating in remote geographical areas under harsh environmental conditions but historically few have been exposed to the challenges imposed by bearish financial markets and those that have, for the most part, have either been acquired or merged. The most recent spate of mega-mergers is confirmation that new business problems are still being resolved using traditional industry solutions.

When the investment community collectively decides to withdraw 80% of its investment out of the sector the consequences can be dire. Project funding becomes difficult and more importantly core business focus is diverted from finding and replacing reserves to finding and reducing overheads. Competition to find additional oil reserves is superseded by the need to sustain market capitalisation and shareholder value and it could be argued that the effects of a reticent investment community are a new challenge for the oil industry.

Overcoming this new challenge is proving to be a difficult task for most oil companies as they struggle to find ways to reduce costs and maintain operating margins without compromising core business growth. The advent of the Internet is perceived by many companies to be the investment saviour of the industry as it not only delivers potential cost savings, but more importantly, a link to the technology sector that for the most part, has displace the oil sector as the preferred investment destination. Competitive advantage however, has never been about technology, but the application of the technology to deliver maximum value and perhaps the biggest challenge facing the industry today is in understanding the power of Internet technology and finding ways to use that power to deliver additional value.

The Influence of Technology

Whether or not technology has changed the energy industry or the energy industry has changed technology is debatable. Certainly the need to explore, develop and produce reserves from deeper waters and under tougher environmental conditions has forced both disciplines to collaborate in terms of technology development and application. Advancements in computer technology in particular, have changed the industry by enabling companies to acquire, process and interpret larger and larger amounts of technical data. Drilling, development and production advancements have expanded the geographical frontiers to deeper waters offshore and more remote locations onshore. Until recently there have been very few technical developments that have impacted the 'business' side of the industry, or at least none

that were recognized as having a significant impact. The primary reason for this is because the technology advancements that have been developed to date have focused on the operational aspects of the industry, how to do things better, not necessarily different. Internet technology however is different in that it not only has the potential to do things better, but faster, more efficiently and in real-time.

Technical data has little value unless it can be formatted into information and then interpreted into knowledge. It is the knowledge created from the data that provides companies with the ability to realise value from their assets and develop successful exploration, development and production strategies. The Internet is an 'enabling' technology in that it facilitates the creation of knowledge. In much the same way computers introduced the business world to information management, the Internet is introducing the business world to knowledge management.

Knowledge management is a term that has become very popular in recent years and in its current state can be defined as anything from a specific piece of search engine software to an intranet system supported by a very large and expensive database. The fact that knowledge management has a variety of different definitions illustrates the dilemma facing many companies in terms of understanding the effects of Internet technology on their businesses.

Knowledge, for the purpose of this paper, is defined as 'interpreted' information. Information that has been collated, processed, interpreted and analysed generates knowledge and one of the biggest dilemmas in the business world today is how to create, utilise and retain corporate knowledge. This problem is especially relevant to the energy industry where technical and business knowledge has been eroded and in some cases destroyed through mergers, acquisitions and restructuring. The loss and destruction of corporate knowledge is reaffirmed by the fact that finding and producing costs in the US have increase during the past two years despite a reduction in the workforce by 13% over the last four years[4]. Unfortunately, one of the great injustices of the oil industry has been the creation and subsequent destruction of a specialised, extremely well educated and talented workforce in which knowledge creation was limited only by the availability of accurate, reliable information.

It is ironic that in this particular instance the introduction of technology, namely the Internet, has not made the situation any better; in fact it has arguably made matters worse. The problems associated with creating, utilising and retaining corporate knowledge have been exacerbated by the unlimited availability of real time information that now has to be collated, processed, interpreted and analysed by a smaller, arguably less efficient workforce. The challenge facing the industry therefore is more than just adapting to the new technology and finding ways to deliver additional value, the real challenge will be adjusting to the new global e-economy.

The New e-Economy

The new e-economy operates in real time. It is borderless, seamless, paperless, wireless and unlimited in terms of its ability to change the way in which business in conducted throughout the world. It is dynamic, totally transparent and capable of delivering 24/7/365[5]. It has the potential to revolutionise the oil industry or become its worst nightmare. This potential saviour of the oil business will not deliver the added value and return of investor interest as previously anticipated by many of the oil companies unless the companies themselves change. The new e-economy will change the global business culture by delivering only one commodity – information, and lots of it.

The oil industry by its very nature has never been in the enviable position of having too much information. In fact most oil companies would probably argue that historically the majority of their investment decisions have been made using insufficient technical data and risk adjusted accordingly to account for the uncertainties associated with the lack of additional information. Inherent in the process of making decisions under uncertainty is the ability to manage information and more importantly, knowledge. In an industry that is unique in terms of its dependence on analysing and interpreting technical data, it is the more successful companies that maintain the ability to not only create knowledge but also manage it effectively regardless of the amount of information available. This ability is one of the fundamental principles supporting the concept of the virtual oil company.

The dilemma currently faced by the oil industry is encapsulated in the threat posed by the Internet's ability to access, transmit and deliver information virtually instantaneously. How does an industry that historically has relied on very limited amounts of information to make investment decisions and whose development and investment cycles are usually measured in decades, cope with something like the Internet?

How the Internet is perceived in terms of what it can or cannot deliver has a profound effect on how companies react and eventually adjust to the new e-economy. Understanding not only what is delivered but also how it is delivered will most certainly be a major factor for most companies in deciding whether or not the Internet is a threat or saviour. Indeed for many of the major companies that have already developed online initiatives such as e-procurement and asset trading, the Internet is being perceived as the saviour that will simultaneously resuscitate investor interest and provide a mechanism to streamline business processes. The focus however continues to be on reducing costs and in many respects is still being driven by the investment community and their desire to resurrect the oil industry as the preferred destination for investment capital. But despite the fact that most of the major oil companies have already announced e-initiatives and the fact that the oil price is again hovering around $30 per barrel, the oil industry is still one of the worst performing stock market sectors. The realisation, unfortunately, is that e-commerce goes far beyond procurement and reducing costs and the industry as a whole, is simply not fully prepared for the new e-economy.

The new e-economy is about content and delivery. The content is essentially unlimited information from all parts of the globe and the delivery is all about speed, the speed of completing a procurement

transaction, the speed of making an accurate, well informed decision, the speed of developing on-line communities, the speed of saving, making or losing money. It is this aspect of the Internet that threatens most oil companies today.

In the new e-economy oil companies will not only have to manage more information, but transact business faster and assuming they remain committed to their historic practices, do so with less people and a greatly reduced knoweldege base. An industry that was comfortable with making investment decisions with limited information is now uncomfortable in having to deal with too much information, too little time and not enough knowledge. Add to this the dilemna of a disinterested investment community and you have the impetus to redefine the classic oil company business model in terms of core business principles, culture and strategic objectives.

Redefining the Core Business

Fundamentally the core business for most oil companies has not changed significantly in the past century. Most companies still regard the technical aspects of the business as being critical to the success of the company and as such continue to employ geologists, geophysicists and engineers. Finding, developing and producing oil and gas reserves in a way that increases profits, maximises shareholder value and preserves the environment is arguably the preferred core business of the majority of oil companies operating today. In direct contrast, a redefined core business that is focused on creating, utilising and retaining corporate knowledge would at the very least be a radical change for these companies and one that would no doubt produce a plethora of resentment from the technical staff. The ironic thing about the redefined core business is that it should not instigate riots amongst the professional staff. Creating, utilising and retaining corporate knowledge are skills that most explorationists and engineers either already possess or are extremely capable of developing and it is the redirection of these skills that will inevitably facilitate the redefining of the core business.

Although corporate mission statements usually make reference to adding or maximising shareholder value, few expound on the intrinsic value of the knowledge that is retained by the personnel within the company. However it is precisely this attribute that will need to be exploited in order to ensure corporate survival in the new e-economy. The creation of corporate knowledge is the result of a process that includes the development of infrastructure that not only enables the capture of information, but the analysis and eventual transformation of the information into knowledge.

The definition of corporate infrastructure includes a mixture of soft and hard issues. The concept of working in ‘real time’ and managing an organisation that is transparent in terms of information and knowledge flows will no doubt come as a huge shock to those accustomed to working with limited data resources. Arguably the biggest cultural change for many organisations adapting to the new e-economy will be knowledge sharing and the dismantling of information ‘empires’ that have been built up through years of information ‘hoarding’. The difficulty of accomplishing this task will be exacerbated by the

introduction of other concepts such as ownership of information which some advocates may argue is the same as hoarding. In actual fact ownership of information relates to the quality of information whereas hoarding refers to the sheer quantity of information being retained. The quantity of information becomes relevant only when information itself is a limited commodity that is difficult to access and retrieve. This subtle but fundamental difference in definitions relates to changes in core business infrastructure and underpins many of the softer issues that are no longer applicable in the new e-economy.

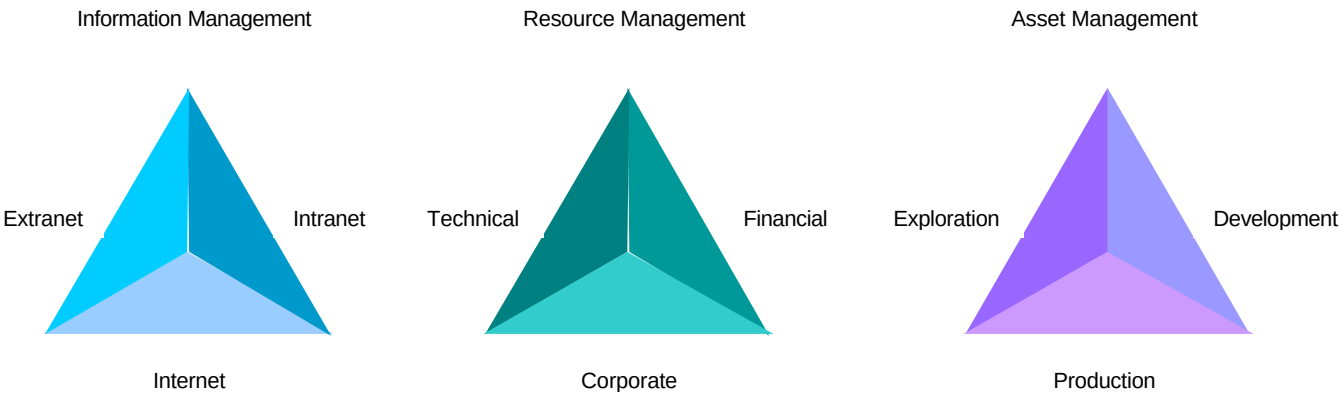
The hard issues defining corporate infrastructure relate primarily to communications. A redefined core business based on knowledge has to have the ability to manage information quickly and efficiently. Internet, intranet and extranet capabilities need to be prioritised around the knowledge centres that will eventually define the core of the virtual oil company. It is also important to note that the most common mistake in e-developing companies is their reliance on state of the art technology. An effective communications infrastructure does not depend on existing technology it utilises it to maximise efficiency.

Creating the Virtual Oil Company

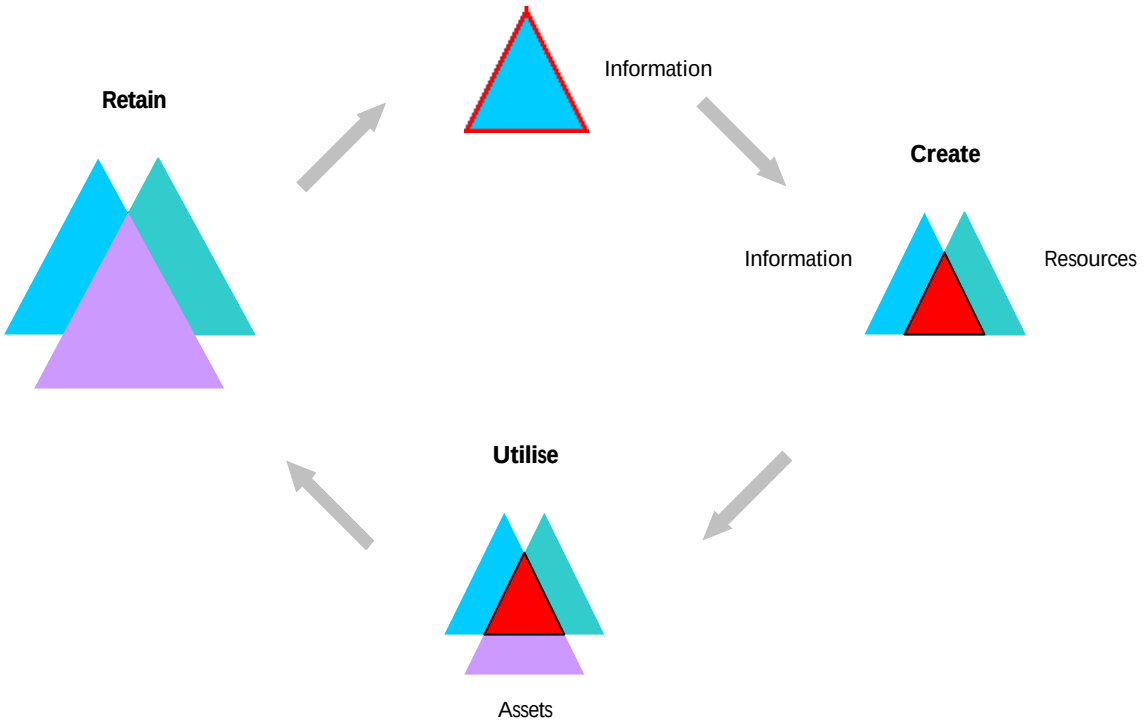
At the heart of the virtual oil company is the core business of managing knowledge. The adage '*oil is found in the minds of men*' has never been more relevant than in the new e-economy. For the virtual oil company, finding oil becomes a consequence of successful knowledge management. Knowing where to explore, shoot seismic or drill is not a function of the quantity of data or technical expertise any one company possesses, it is the result of making the right decision at the right time using the right information. This principle of effective knowledge management is fundamental to creating the virtual oil company.

Effective knowledge management is defined as maintaining the ability to create, utilise and retain relevant corporate knowledge, which in theory is easy to describe, but in practice, difficult to apply. The diagrams below attempt to clarify the concept of effective knowledge management.

Management Elements



Effective Knowledge Management



The cycle of creating, utilising and retaining corporate knowledge relies on the integration of three management systems: information, resources and assets. These three systems collectively provide the foundation for redefining the core business and individually, the functionality required to manage the virtual oil company.

Information management in the new e-economy has to focus on delivering timely, accurate, relevant information 24/7/365. The global availability of information via the Internet, intranets and extranets needs to be managed in a way that reduces the amount of time spent searching and/or filtering information and increases the time available for interpretation and analysis; i.e. knowledge creation. To this end the priorities of the information management system need to be directed by the decision makers and knowledge creators, the people at the heart of the virtual oil company. Information management can no longer be considered a support service or non-core business activity.

Resource management in the new e-economy is based on the premise that virtual technical, financial and corporate resources are available online and in real time. The challenge for oil companies then becomes one of building online centres of 'excellence' that can be used to create new ideas, solve existing problems and/or re-evaluate old opportunities. The development of these centres is dynamic and borderless in terms of geographical location and areas of expertise and caters specifically to the business needs of the company.

The integration of disciplines within the resource structure needs to be seamless and free from political, personal and cultural constraints in order to facilitate knowledge creation. Resource teams work

together to develop and refine business concepts that can then be utilised to identify assets and opportunities for divestment and/or acquisition.

Of the three management systems that define the virtual oil company, the resource system is without doubt, the most important. It is the catalyst behind knowledge creation and utilisation and plays a central role in defining the ultimate success of the company in the new e-economy.

There are several facets to virtual asset management that are contrary to classical oil company management philosophy. Traditionally, the objective of most oil companies has been to try and exploit the value of oil and gas assets whether they be exploration, development or production assets. Adding value and in particular monetising upside potential has historically been a difficult technical challenge for many companies and during the past few years a skill that has not been highly regarded by the investment community. The problem in the past however has not been one of exploiting value, but rather assessing value. Limited information and technical expertise in the past has produced limited valuation knowledge and what knowledge that was available was more than likely lost during the last downsizing or corporate restructuring exercise. Asset management in the new e-economy is about value assessment. It is the utilisation of corporate, technical and financial knowledge to identify undervalued assets for acquisition and overvalued assets for divestment. It is about the utilisation of real time information to reassess asset valuations daily and adjust corporate strategies accordingly.

Creating the virtual oil company is about real time management of information, resources and assets. It is not so much a process of restructuring or strategic change, as it is a major rebuild of core business skills and corporate culture. It is a process that recognises the rapid convergence of geographically disparate economies into a single global market and a world that has conditioned itself to become less dependent on oil. The virtual oil company is the company of tomorrow and it will have to maintain the following attributes in order to survive in the new e-economy;

- Management flexibility to accommodate and accept change
- An understanding of the value in creating and sharing corporate knowledge
- Ability to redefine core business activities
- Development of an ‘online’ global culture

In this new e-economy corporate complacency will be measured in days not years and business decisions will be made in hours not days or months. For the industry as a whole the challenge will not be how to drill deeper wells or acquire better seismic, but how to capture, analyse and exploit knowledge in order to make better, faster decisions.

Summary and Conclusions

Without a doubt the oil industry will change more in the next ten years than it has in the past fifty. The technology that has enabled companies to explore deeper, develop quicker and produce longer will in all likelihood continue to provide cost effective benefits to the industry for the foreseeable future.

The catalyst for the anticipated rapid change over the next ten years will be the Internet. The emergence of a communication-based global economy that operates in real time will invoke unprecedented changes on the oil industry and will force companies to either adapt or perish. Just how companies adapt to the new economy will depend on a number of factors including their ability to accept and manage change. For an industry that has lost investors, credibility and more importantly knowledge, survival will require more than just cosmetic surgery to corporate strategies and procedures. Radical changes to core business objectives and corporate culture will provide the foundation for the new virtual oil companies.

The continued evolution of the virtual oil company will be determined by the desire of the industry to remain competitive in the new e-economy. Certainly the original concept of outsourcing was driven by the need for companies to remain competitive and attractive to the investment community. The virtual oil company will not be created overnight and it is arguable as to whether or not it will ever be created to the extent described in this paper. However it is clear that the oil industry needs to incorporate change in order to guarantee its existence and influence in the new online economy and the virtual oil company could very well be the saviour that the shareholders and investors have been searching for.

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[1] Ernst & Young, Energy Focus, 2000
[2] Institute for International Economics, Third Oil Shock: Real or Imaginary? Consequences and Policy Alternatives, April 2000
[3] Arthur Anderson Global E&P Trends, July, 2000
[4] Ernst & Young, Energy Focus, 2000
[5] 24/7/365 refers to availability 24 hours a day, 7 days a week, 365 days a year