The Changing World Petroleum Industry: Bigger Fish in a Larger Pond

*By Peter A. Davies**

The most remarkable characteristic relating to the oil industry is probably the fact that its industrial structure remained largely intact for some seventy years or so, despite a wide range of global changes in markets, geopolitics and technology.

This period of constancy appears to have come to an abrupt end during 1998/99 as a period of corporate consolidation was launched. The first move was the merger of British Petroleum (BP) and Amoco. This has been followed by the proposed acquisition of Mobil by Exxon and a number of other consolidating moves.

What is the Petroleum Industry?

The petroleum industry could once be defined as the set of private sector companies who explore for and produce crude oil and natural gas and refine and market oil products as their main source of business. Some companies undertake all of the above functions–the integrated companies. Others undertake only one or some of them.

The industry can be categorised as follows:

Majors

Large integrated players. Traditionally this comprised Exxon, Royal Dutch/Shell, British Petroleum (BP), Mobil, Chevron and Texaco. Prior to 1984 this group also included Gulf Oil. They were known as the "Seven Sisters". Chevron acquired Gulf Oil in 1984. To some degree a group of slightly smaller integrated companies could be added to this list, e.g., Amoco and Arco and, since their privatisation, Total, Elf and ENI.

Other Integrated

This group is similar to the majors but smaller in size and with less geographical reach. It comprised companies such as Amerada Hess, Conoco, Diamond Shamrock, Marathon, Occidental, Philips, Unocal and Ultramar.

Independents

These are yet smaller companies, most of whom specialise in a single segment. They include, for example, Anadarko, British Borneo, Enterprise, Kerr McGee, Lasmo, Ramco, Saga and Talisman.

This definition of the petroleum industry thus explicitly excludes all state owned petroleum companies. These include large state producing companies such as Saudi Aramco, Petroleos de Venezuela, Pertamina of Indonesia from OPEC and non-OPEC state producers such as Statoil of Norway, Petrobras of Brazil, Pemex of Mexico and Petronas of Malaysia.

This definition of the petroleum industry also specifically excludes electricity companies and most gas marketing companies.

A key theme of this paper is that this traditional definition of the industry has become too narrow. The petroleum industry is progressively including state companies and, to some degree, gas marketing and power companies.

Emerging Forces for Change During the 1990s

Structure and Forces Prior to the 1990s

The structure of the private sector oil industry remained extraordinarily stable from the 1920s until the late 1990s.

Up until the demise of Gulf Oil in 1984 the private sector oil industry was characterised by a core of seven firms–the "Seven Sisters." From 1950 the Majors consistently increased their asset base. Those that conspicuously failed to replace lost Middle Eastern assets were soon to become troubled. The failure of Gulf Oil to replace Kuwaiti production and its subsequent demise was evident.

The nationalisation of upstream assets in the Middle East and elsewhere was a fundamental blow to the Majors who had been the leading players in most of the Middle East and other OPEC member states. However, the Majors survived (with the eventual exception of Gulf Oil) and to some degree prospered. They remained at the forefront of the private sector industry through the 1970s and 1980s.

Sources of Competitive Advantage

The 1990s proved to be a period when forces began to build which eventually led to important changes in the structure of the industry. The leading positions of the Majors had been reinforced for a long period by their deep rooted sources of competitive advantage. These were reflected in a set of 'strategic assets' that advantaged the Majors relative to other private sector players. These included:

Upstream: these were mainly large, low cost oil and gas fields. Initially they were mainly in the Middle East. They were then partially replaced by large North Sea and Alaskan fields.

Downstream: the main strategic assets were advantaged refineries and significant retail positions in key markets. Most of the industry's refining assets, at least in OECD countries, were commissioned prior to the 1980s. Advantaged real estate and scale economies had been secured.

Petrochemicals: strategic advantage in petrochemicals has tended to stem from technology, location and feedstock access.

Corporate: in a world of imperfect and heavily regulated capital markets, financial strength proved a source of competitive advantage.

These strategic assets were sustained by a number of key characteristics, for example:

Technical skills and the ability to innovate: the Majors have remained at the forefront in their abilities to apply the best technology and innovate in new applications.

Highly effective *logistical skills.*

Reputation and relationships: the Majors had critical strong relationships with both home and host governments, suppliers and customers.

New Competitive Forces

The 1990s witnessed a build-up of forces that has eventually led to a restructuring of the industry through

---

* Peter Davies is Vice President and Chief Economist of BP Amoco plc, London, and Honorary Professor at the Centre for Energy, Mineral and Petroleum Law and Policy at the University of Dundee. This is a summary of his paper presented to the British Institute of Energy Economics Conference, St. John's College, Oxford, 21 September, 1999. The full version of the paper can be seen in the CEPMLP On-Line Journal at www.cepmlp.org

consolidation. The main elements of these forces included:

- natural ***maturity*** of previously advantaged fields. The "endowments" of the Majors, especially in the upstream began to erode. Big fields matured and began to decline. Equally, the Lower 48 states of the United States was also in decline.
- tighter *ex post* upstream ***fiscal terms*** for new fields and new provinces.
- the entry of ***state oil companies*** into downstream markets.
- the ***privatisation*** of previously state owned oil and gas companies, e.g., Total, Elf, ENI.
- changing ***geography***. The fastest growth occurred in non-OECD markets, especially Asia.
- international ***financial markets*** deregulated, giving many private and state oil companies increased access to capital.
- ***intermediate commodity markets*** developed which effectively disintegrated the oil industry on an operating basis. This gave the opportunity for new entrants to enter specific parts of the previously integrated value without being disadvantaged.

At the same time, and partly as a result of a number of these factors, the real price of oil and refining margins fell on a trend basis as supply growth outpaced demand growth. Petrochemicals margins also fell. A renewed deep downswing in the chemicals cycle developed.

The pressure of these forces can be seen by the fact that the petroleum industry was relatively unsuccessful in generating earnings growth and in achieving above average returns for shareholders.

Initial Responses

The industry attempted to respond to deteriorating performance in several ways:

1. *Cost cutting*. Cost reductions at corporate levels and in operating assets was the prime response. Upstream costs were successfully reduced, often through operating and technological innovation. Technological advances included horizontal drilling, subsea completions, floating production systems, seismic data processing, etc.
2. *Portfolio Restructuring*: non-core businesses were shed as petroleum companies went "back to basics". Most coal and minerals operations were sold.
3. At the same time, some companies also entered new sectors that opened in the face of deregulation. U.S. gas marketing attracted Chevron and Shell purchased Tejas. Others invested in the electric power sector, mainly generation and usually IPPs. In the majority of instances these investments have either proved unrewarding or slow to generate adequate returns.
4 *Focus on New Growth Areas*: U.S. companies in particular sought new business opportunities outside their core U.S. markets. Many U.S. upstream companies invested in the UK North Sea. Most companies declared a strategic intent to invest in Asian growth markets. Few had any success. The Former Soviet Union proved to be particularly challenging.
5 *Financial Management:* shareholder returns were enhanced in several cases through share buy back schemes.

Cost cutting, portfolio highgrading and shareholder buybacks were the most successful responses. Attempts to grow organically generally proved less rewarding. In total the petroleum industry continued to underperform relative to the S&P 500.

Sectorial Consolidation

As it became progressively clear that the four strategic responses outlined above were insufficient, a number of companies began, independently of each other, to develop and implement a new strategic response through structural change–sectorial consolidation.

The first major move was by BP and Mobil who merged their European oil refining and marketing assets and lubricating oil operations. This permitted cost cuts through elimination of duplication. They also increased retail market shares so that the BP-Mobil JV was able to compete on equal terms with Shell and Exxon.

This merger was followed by Shell and Texaco (plus Star,) merging in 1998 into two regional companies. Ultramar and Diamond Shamrock and Ashland and Marathon also effected U.S. downstream mergers. In the U.S. upstream, the Permian Basin assets of Shell and Amoco were merged to create 'Altura'.

"Mega Mergers": A New Era for the Petroleum Industry

These sectorial mergers, while in some cases successful in increasing profitability at the micro level, were insufficient to have a fundamental impact upon corporate level profitability and returns. Corporate transformation thus required a greater response.

The first corporate level move was the merger between British Petroleum and Amoco to create BP Amoco. This created a new "super major" approximately equal in size to Exxon and Royal Dutch Shell.

The merger had both a cost saving and strategic rationale. A cost reduction of $2 billion was realised.

In terms of strategic rationales, the merger solved many of the portfolio dilemmas of the two separate companies. For example, BP had for many years been aspiring to increase the size of its gas business. Amoco was the largest North American natural gas producer. Amoco had long been seeking a rebalancing of its portfolio with access to growth outside North America. BP provided the lead position in the UK North Sea.

The merger of the two medium large companies to make a large "super major" offered a further potential gain. Both companies had previously felt inhibited in holding large shares of material growth options. The new size of the company offered "reach". This implied both the ability to retain a large share of a growth option and the ability to chase a wider range of options at any one time.

The BP Amoco merger was followed by a series of other deals that have further transformed the structure of the petroleum industry. Most importantly Exxon and Mobil announced in December, 1998 their intention to merge. The rationale is again cost saving with the expectation that Exxon's corporate cost culture will rapidly squeeze costs out of Mobil's operations.

The French company Total also responded aggressively. First it announced its merging with Fina of Belgium. Total/Fina then launched a bid for French rival, Elf, which was eventually accepted by Elf. The joint group will become the fourth largest petroleum company in the world. Meanwhile,

(continued on page 12)

Changing World Petroleum Industry *(continued from page 11)*

Repsol of Spain acquired YPF of Argentina.

Low oil prices were not a primary driver of these mergers. The main objective was to enhance performance and profitability, whatever the external environment, and to create or access growth options. Low oil prices, nevertheless, increased the urgency to improve performance.

On 1 April 1999 BP Amoco announced its intention to acquire Arco (Atlantic Richfield). This potentially provides BP Amoco with a U.S. West Coast refining and marketing presence, an increased share of Alaskan exploration and production and a set of Asian natural gas assets.

New Drivers of Competitive Advantage

The Industry Has Changed

This set of deals will, if completed, establish a new petroleum industry structure. The rankings of companies in terms of market capitalisation, production and reserves has changed significantly. See Table 1. A new group of three super majors (Exxon-Mobil the largest, followed by BP Amoco (+Arco) and Royal Dutch Shell) are the largest companies with Total-Fina/Elf fourth in terms of market capitalisation.

Changing Industry Boundaries

The change to the industry structure has in fact been more profound. Previously, the private petroleum industry had been defined as it had existed in the 1980s and into the early 1990s. The boundaries were clearly defined. Competition from players outside the industry–namely those whose main business was not petroleum production, refining or marketing –was limited.

Table 1: Petroleum Company Market Capitalisations

(US$ billion)

1 January 1998		9 September 1999	
Shell	191.0	Exxon + Mobil*	280.3
Exxon	150.9	Shell	221.8
BP	75.8	BP Amoco + ARCO*	215.3
Mobil	56.6	Total FINA + Elf*	98.1
Chevron	50.6	Chevron	64.0
ENI	45.5	ENI	48.0
Amoco	41.5	Repsol + YPF	38.3
Elf	32.2	Texaco	37.2
Texaco	29.8	Conoco	18.1
Total	26.6	Philips	13.5
ARCO	25.7	Petrobras	13.3

Source: Datastream

* Assuming pending transactions completed

Other changes have taken place within the industry during the 1990s. These have had the effect of redefining the industry boundaries, structure and definition. The key forces of change have been:

- The ***disintegration*** of the industry at an operating level. Previously vertical integration had prevailed from the well head to burner tip or pump. Intermediate markets have now been established and deepened along the value chain. The net result has been that barriers to entry have fallen along all of the chain and new specialist entrants have emerged in most segments.
- ***Deregulation*** has had the effect of opening up previously closed sectors to competition. The boundary between the old petroleum industry and the new deregulated gas and power industries is now indistinct.

Table 2: Market Capitalisation of Selected Private Energy Companies

US$ billion as of 9 September, 1999.
Excludes State owned companies.

Rank	Company	Country of Head Office	Market Capitalisation
1	Exxon + Mobil	US	280.3
2	Royal Dutch/Shell	UK/Neth.	221.8
3	BP Amoco + ARCO	UK	215.3
4	Total FINA + Elf	France	98.1
5	Chevron	US	64.0
6	ENI	Italy	48.0
7	Schlumberger	US	38.5
8	Repsol + YPF	Spain	38.3
9	Texaco	US	37.2
10	Tokyo Electric Power	Japan	31.1
11	Enron	US	30.2
12	Korea Electric Power	S. Korea	25.3
13	BG	UK	24.6
14	Halliburton	US	22.4
15	Endesa	Spain	21.4
16	Duke Energy	US	21.0
17	Kansai Electric Power	Japan	19.1
18	Southern	US	18.4
19	Conoco	US	18.1
20	Chubu Electric Power	Japan	13.6
21	Phillips Petroleum	US	13.5
22	Petrobras	Brazil	13.3
23	Iberdrola	Spain	13.3
24	Norsk Hydro	Norway	12.1
25	CLP Holdings	Hong Kong	11.8
26	Baker Hughes	US	11.7
27	P G & E	US	11.5
28	Scottish Power	UK	11.1
29	Gas Natural	Spain	10.9
30	Texas Utilities	US	10.8
31	Centrica	UK	10.6
32	Unocal	US	10.3
33	USX-Marathon	US	10.3
34	National Grid	UK	9.8
35	Electricidada de Portugal	Portugal	9.8
36	Consolidated Edison	US	9.7
37	National Power	UK	8.9
38	Edison International	US	8.7
39	Dominion Resources	US	8.7
40	Public Service Enterprises	US	8.7
41	Occidental	US	8.3
42	Houston Industries	US	8.1
43	Peco Energy	US	7.8
44	Burlington Resources	US	7.8
45	Kyushu Electric	Japan	7.5
46	Powergen	UK	7.0
47	American Electric Power	US	6.9
48	United Utilities	UK	6.5

Source: Datastream

The net result is that the boundaries of the petroleum industry have now changed. The industry should now be considered to include:

- state companies such as Saudi Aramco, PDVSA, etc.
- new refiners such as Tosco and Valero
- hypermarkets (such as Tesco, Carrefour) who have at-

tained a substantial share of a gasoline market

- gas companies such as Enron who is a gas producer and transporter but is also a leading gas marketer and trader, power generator and power retailer and
- electric power companies such as Southern, Duke and PG & E who market gas as well as generating and distributing electricity.

The industry ranking including power companies, gas companies and service companies (see Table 2) now looks different from that shown in Table 1, even when state owned companies are excluded from the classification. The big fish have gotten bigger–but the pond is distinctly larger, too.

The "Super Major Theory"

Though there is no unique theory, the "Super Major Theory" has the commom theme that the super majors will be in a position to dominate the petroleum industry.

The European Commission was particularly concerned that in time the super majors and OPEC would control the E&P sector and thus be able to manipulate crude oil prices to a level which generates maximum rent for the incumbents (i.e., the OPEC states and the super majors).

BP Amoco argued strongly that this hypothesis was flawed. A number of factors were cited to support this argument:

1. The super majors do not have dominant access to technology, know-how and skilled labour.
2. Financial resources and strength do not reside uniquely in the super majors.
3. Resource owners–host governments–are very unlikely to permit a group of three companies to dominate development and production of their resources. Host governments regularly diversify their allocation of licences.
4. Small E&P companies have been successful in discovering and developing oil and gas in frontier regions.
5. Super majors are not and will not be in a position to control levels of oil production either now or in the future. In practice, control over both production and field abandonment is severely constrained by a number of factors:
   - The companies in a vast majority of cases do not operate under exclusive licenses–but rather as joint venture partnerships.
   - Companies are precluded from controlling production. The ultimate control of production levels lies with host governments.
6. The super majors may be the largest private petroleum companies by several measures. However, as Tables 3 and 4 show, their total share of world reserves or production is still small and well below any measure of dominant shares.

To be convincing, any version of the super major theory would require a number of conditions to hold:

1. The super majors' existing share of a relevant market must be high. As Tables 3 and 4 show this does not hold today
2. Host governments would need to permit the super majors to control production volumes and asset abandonment.These conditions do not hold today and cannot reasonably be expected to hold at any time in the future.

The competition authorities have shown greater and more specific concerns about competition in downstream oil markets. Undertakings as to divestment and other matters

(continued on page 14)

Table 3: World Oil Reserves

	Worldwide			Non-OPEC		
	Gas	**Oil**	**O&G**	**Gas**	**Oil**	**O&G**
	million cf	million barrels	million boe	million cf	million barrels	million boe
BP Amoco	32767	9317	14966	31740	7278	12750
Arco	9844	2842	4539	6844	2522	3702
BPA + Arco	42611	12159	19506	38584	9800	16452
Exxon	42294	6215	13507	42094	5865	13123
Mobil	15712	4738	7447	10512	4338	6150
Exxon/Mobil	58006	10953	20954	52606	10203	19273
Shell	60462	10031	20455	59882	8781	19105
Combined Companies	161079	33143	60915	151072	28784	54831
Worldwide	5170300	1052900	1944331			
Non OPEC				2963500	252400	763348
	% Worldwide Reserves			% non-OPEC Reserves		
BPA + Arco	0.8%	1.2%	1.0%	1.3%	3.9%	2.2%
Exxon/Mobil	1.1%	1.0%	1.1%	1.8%	4.0%	2.5%
Shell	1.2%	1.0%	1.1%	2.0%	3.5%	2.5%
Combined Companies	3.1%	3.1%	3.1%	5.1%	11.4%	7.2%

NB. Some OPEC reserves data for Arco, Exxon, Mobil and Shell are estimated.
Data Source: Annual Reports; BP Amoco Statistical Review of World Energy June 1999.

Table 4: World Oil Production

	Worldwide			Non-OPEC		
	Gas	**Oil**	**O&G**	**Gas**	**Oil**	**O&G**
	million cf/d	thousand b/d	thousand boe/d	million cf/d	thousand b/d	thousand boe/d
BP Amoco	5808	2049	3050	5481	1877	2822
Arco	2104	651	1014	1718	590	886
BPA + Arco	7912	2700	4064	7199	2467	3708
Exxon	6322	1567	2657	6322	1523	2613
Mobil	4295	935	1676	2875	603	1099
Exxon/Mobil	10617	2502	4333	9197	2126	3712
Shell	7862	2354	3710	7756	2019	3356
Combined Companies	26391	7556	12106	24152	6612	10776
Worldwide	219804	73105	111002			
Non OPEC				185911	42375	74429
		% Worldwide Reserves			% non-OPEC Reserves	
BPA + Arco	3.6%	3.7%	3.7%	3.9%	5.8%	5.0%
Exxon/Mobil	4.8%	3.4%	3.9%	4.9%	5.0%	5.0%
Shell	3.6%	3.2%	3.3%	4.2%	4.8%	4.5%
Combined Companies	12.0%	10.3%	10.9%	13.0%	15.6%	14.5%

Data Source: Annual Reports; BP Amoco Statistical Review of World Energy June 1999.

Changing World Petroleum Industry *(continued from page 13)*

have ensured that downstream markets remain competitive.

New Drivers of Competitive Advantage

The petroleum industry, as it had been known in the 1970s and 1980s, has now changed fundamentally. The players have changed. Existing players are consolidating; new players are entering. Previous endowments are eroding. There are no technological barriers to entry. Industry boundaries have shifted, widened and blurred. Some existing players are investing along the value chain into other sectors such as gas marketing and power that had previously been effectively closed to the petroleum industry. It was also argued, that while the new 'super majors' are consolidating to improve performance, partly through cost reduction, it is wrong to presume that their size will cause them to be dominant in the petroleum industry.

The petroleum sector looks set to operate in increasingly open and competitive markets. Three factors seem set to influence this. First, the process of deregulation looks set to continue. Second, host governments are progressively opening their natural resources to international investment. And finally, it can reasonably be expected that the competition authorities will strive to continue to ensure that competition prevails in all stages of the industry.

The structure of the industry will most likely be determined by the degree to which various players establish and apply sources of competitive advantage in open markets.

Where are the new sources of competitive advantage likely to reside? John Kay in his book, *Foundations of Corporate Success,* used a framework which identified four generic dimensions which can drive competitive advantage: strategic assets; reputation; technology; and corporate architecture. This framework can be applied to the petroleum industry:

Strategic Assets: In the petroleum industry of the next decade strategic assets can be expected to include:

- large, low cost oil fields
- large, low cost gas fields with low cost access to markets
- refineries that are advantaged by configuration, geography and costs
- significant retail market shares with low logistical costs and advantaged supply and a strong convenience offer
- ideal sites that integrate refining and petrochemicals

New strategic assets will be created and sustained through building on three characteristics: technology, reputation and architecture.

Technology: technological skills and applications can be expected to be a source of future competitive advantage in a number of dimensions:

- innovation in the application of technology. The best examples of this have been in the upstream sector, especially in deepwater and subsea applications.
- positioning for leadership in face of step changes in technology in areas such as new fuel specifications, renewables, low carbon technology, fuel cells and the hydrogen economy.
- application of IT to reduce operating costs, lead moves into e-commerce, nurture a learning culture and to help sculpt new corporate structures.

Reputation: Reputation will become an increasingly important factor:

- to be a preferred partner in the development of new resources and markets that are being opened to international investment

- to be seen by consumers, communities and governments as being environmentally sound and responsible in terms of operations and product quality
- to be seen as ethically sound by all stakeholders
- to develop a strong brand that can permit the leveraging of marketing operations

Architecture: the successful company will develop and apply a corporate architecture or structure that nurtures behaviours that generate competitive advantage. From today's standpoint such characteristics include low costs, openness, flexibility, learning orientation and empowerment. In the future, the characteristics may change: the key is to be strong in the skills that are scarce.

In short, competitive advantage can be expected to stem mostly from key competences. The era of change now seems well established in the petroleum industry. Change seems to be dominant. Change and openness coupled with new market entrants point to further changes in competitive advantage in coming years. The industrial battleground looks likely to be in terms of core competences with the struggle between the existing players, who build on strengths and combine low costs with flexibility, and new entrants with sector specific honed skills, aggression and dynamism.

Conclusions

The petroleum industry is now in a period of change. The seeds of change initially lay in the OPEC nationalisations of the 1970s. The pressures for change accelerated during the 1990s, driven by opening markets, deregulation and low prices and margins. The pressures manifested themselves in low industry profitability. Sectorial consolidation selectively improved profitability. 1998/9 then saw the emergence of the most dramatic period of consolidation and change for at least seventy years. Three new 'super majors' have emerged as the globally largest private industry players. As mergers are completed, the focus will be on the delivery of enhanced profitability, initially through cost reduction.

A new industry structure is emerging but further change is anticipated. New players with specialised skills are entering the industry. The industry boundaries have widened and blurred in face of deregulation of gas and power and the entry of state companies into internationally competitive markets. The super majors have the potential to improve profitability but will not have unique advantages that could allow them to dominate the industry. The new petroleum industry will be increasingly competitive. Existing strategic assets will provide some advantage to incumbents. However, longer term competitive advantage looks set to be driven predominantly by core competences. Skills, knowledge, flexibility and dynamism are likely to be even more important than absolute size or incumbency.■

References

Bindemann, Kirsten. "Vertical Integration in the Oil Industry: A Review of the Literature" *Journal of Energy Literature* Volume V No 1, June 1999 pp 3-26.

Bleakley, Timothy Gee, David S. and Hulme, Ron. "The Atomisation of Big Oil." *McKinsey Quarterly*. 1997 Number 2, pp. 122—143.

BP Amoco Statistical Review of World Energy 1999. BP Amoco, London. June 1999.

Conn, Charles and White, David. "The Revolution in Upstream Oil and Gas." *McKinsey Quarterly* 1994 Number 3, pp. 71—86 Davies, Peter. "Non-OPEC Oil Production." *Journal of Energy and Development* 1996.

Department of Trade and Industry (UK) "The Energy Report: Competition, Competitiveness and Sustainability". HMSO London 1995.

Economist, London. Various Issues.

Ernst, David and Steinhubel, Andrew M. J. "Alliances In Upstream Oil And Gas." *McKinsey Quarterly* 1997 Number 2, pp. 144—155.

Ernst, David and Steinhubel, Andrew M. J. "Petroleum: After The Megamergers" *McKinsey Quarterly* 1999 Number 2, pp. 48—57.

Financial Times, London. Various Editions.

Geroski, Paul. "The Growth of Firms in Theory and in Practice", CEPR discussion paper no. 2092, March 1999.

Kay, John. *Foundations of Corporate Success*. Oxford University Press 1993. ISBN 0-19-828781-X.

Sampson, Anthony. *The Seven Sisters. The Great Oil Companies and the World They Made*. Viking Press, New York. 1975. ISBN 0-670-63591-X.

Terreson, Paul and Coppola, Paul; Morgan Stanley Dean Witter. Spring 1999: "Company Views and Market Perspectives."

Yergin, Daniel. *The Prize*. Simon & Schuster. 1991. ISBN 0-671-50248-4.

Yergin, Daniel. "Bigger Oil: Merger Mania Will Not Stop With Exxon-Mobil" in *The Financial Times*, 2 December, 1998.